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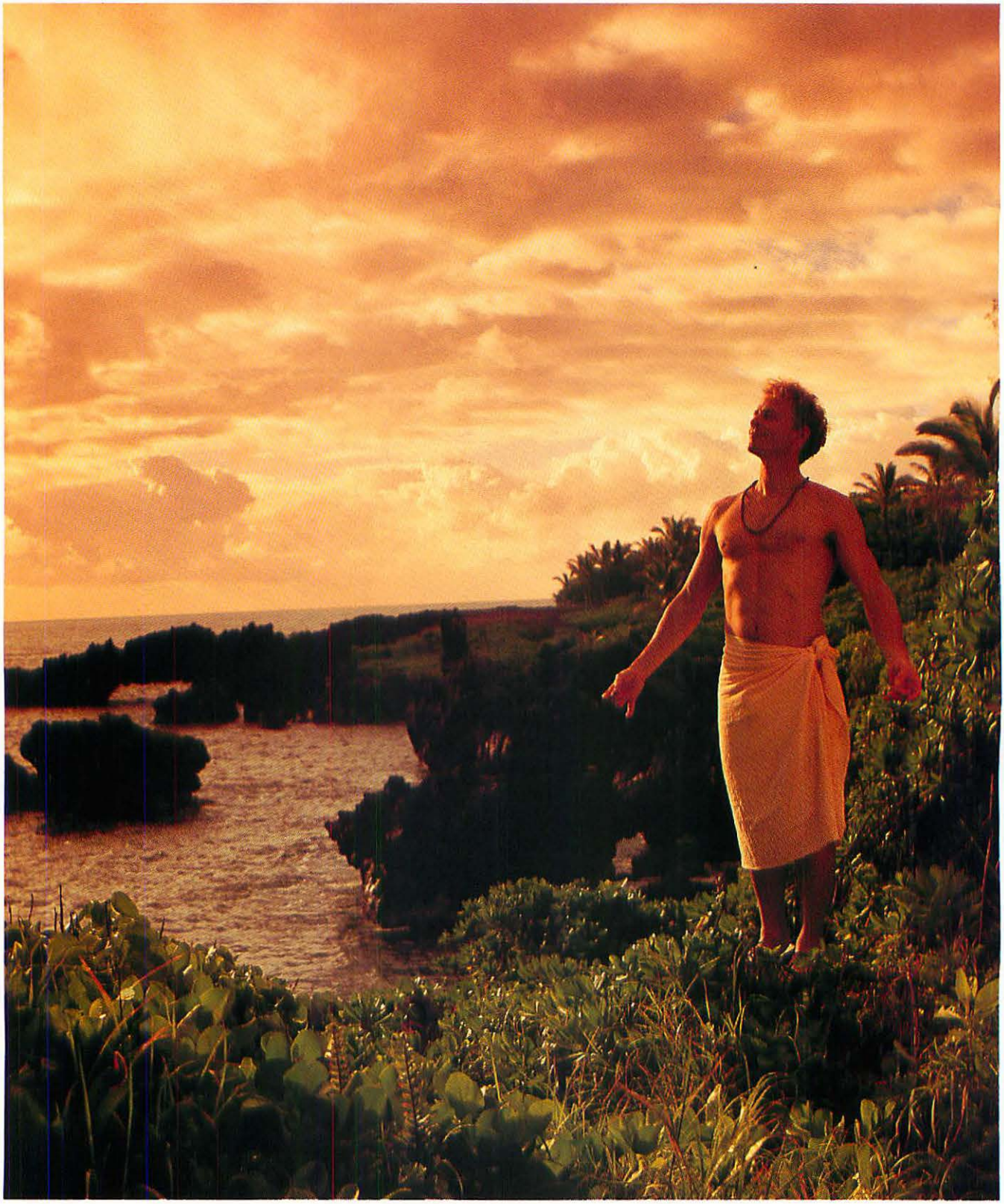

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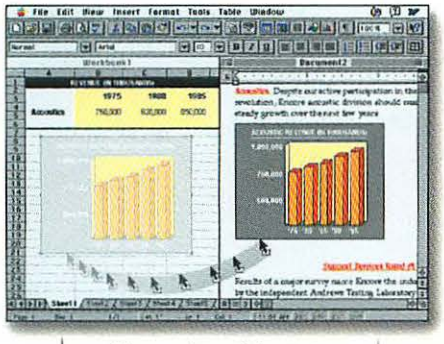

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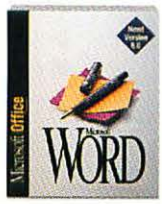

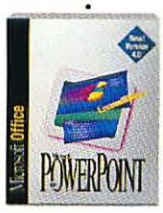

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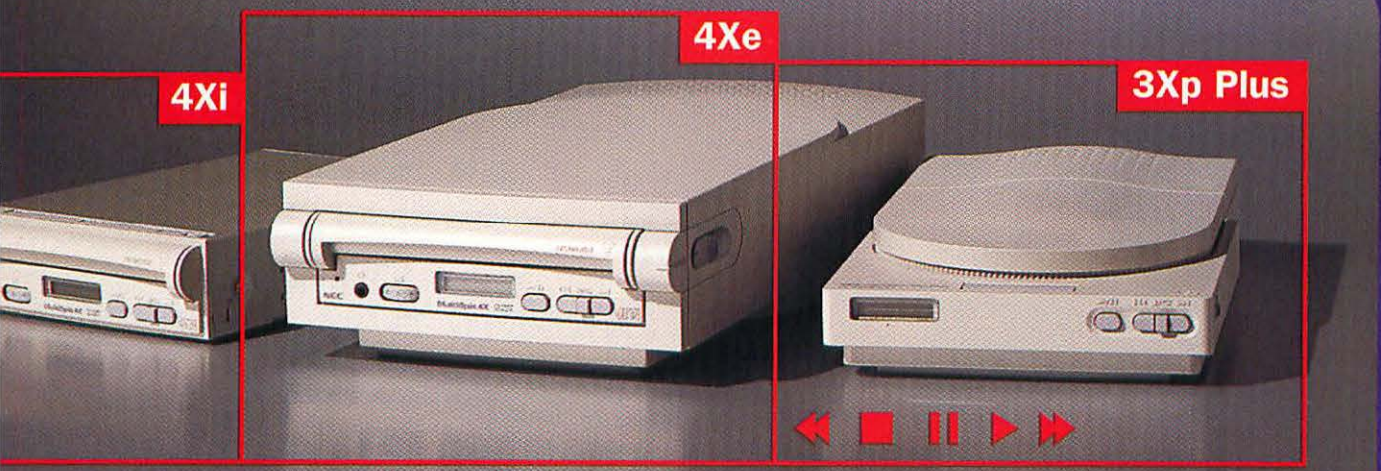

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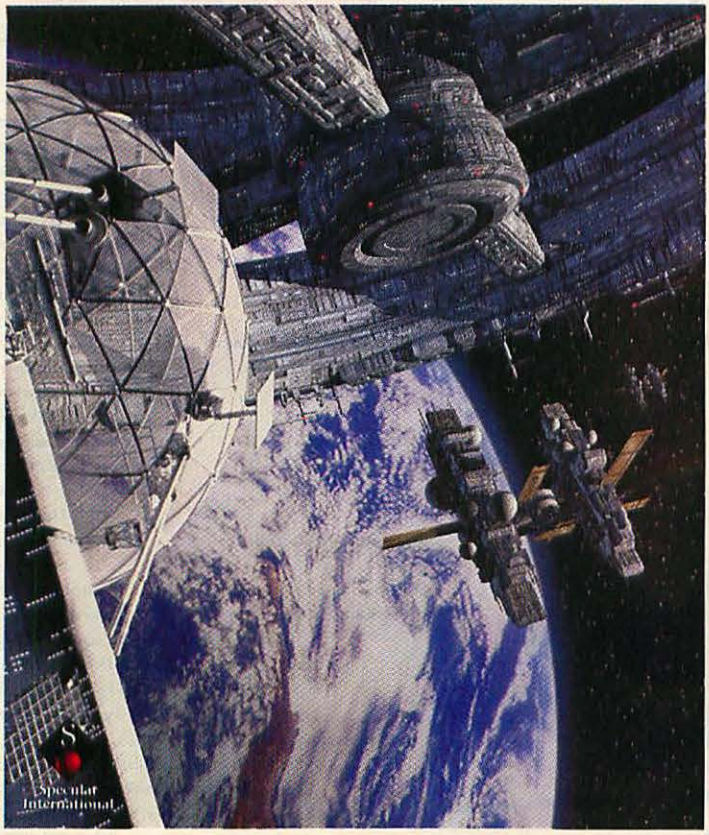

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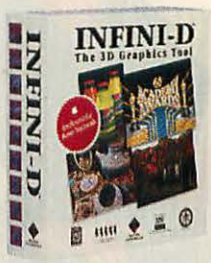

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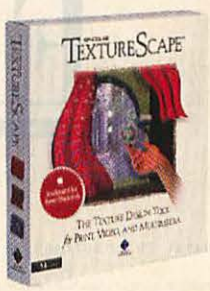

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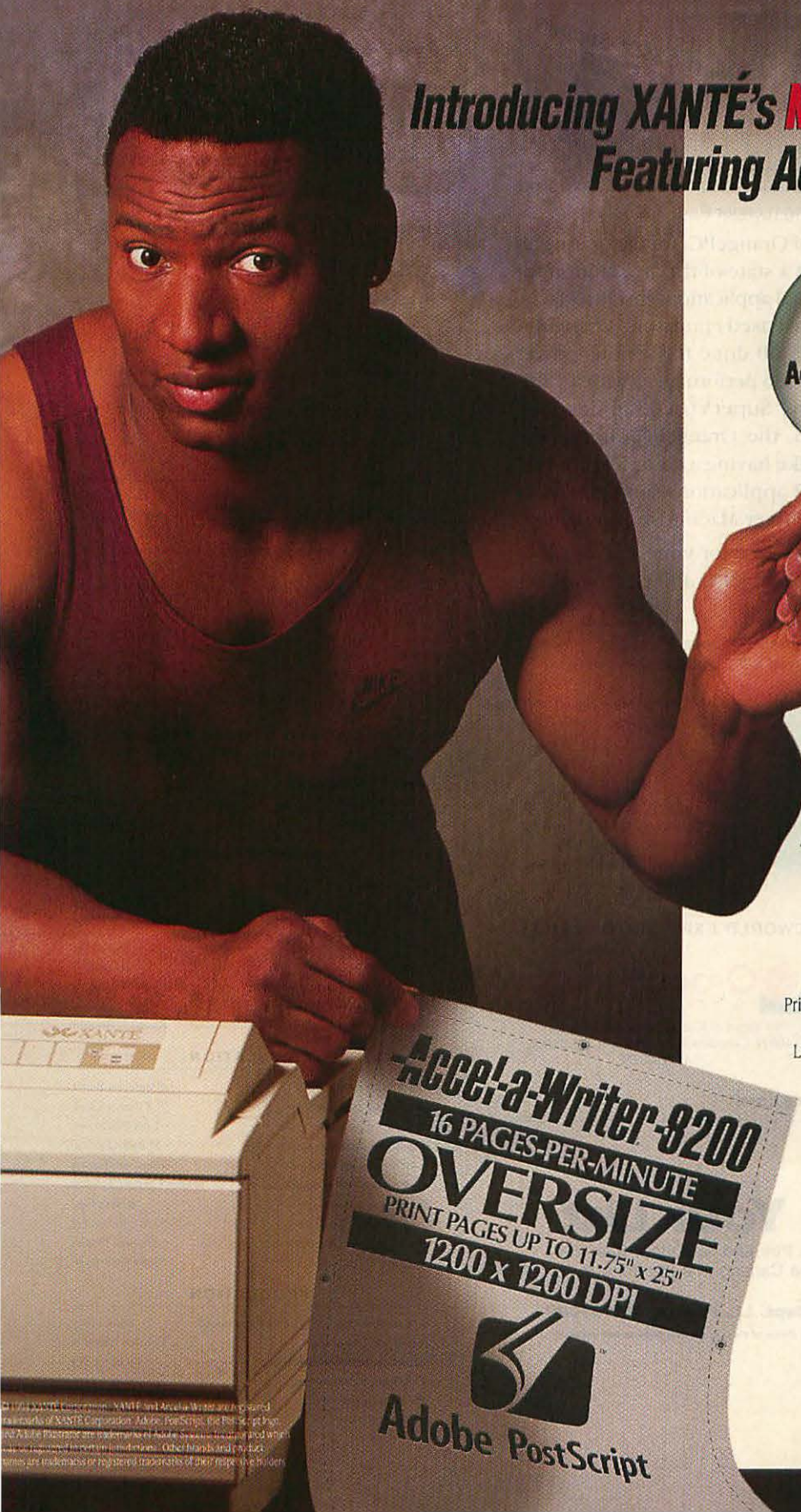

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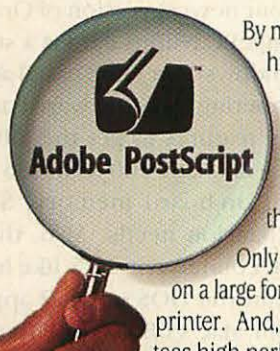

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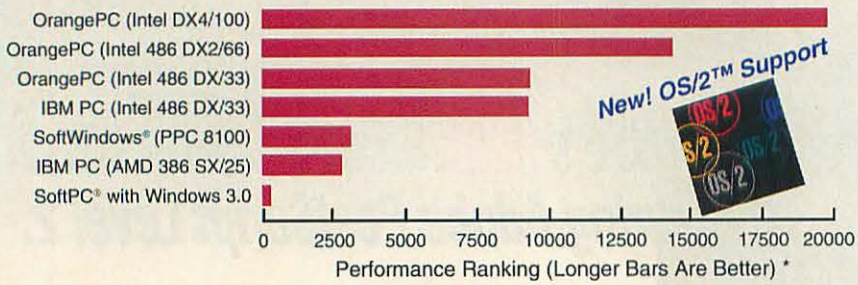

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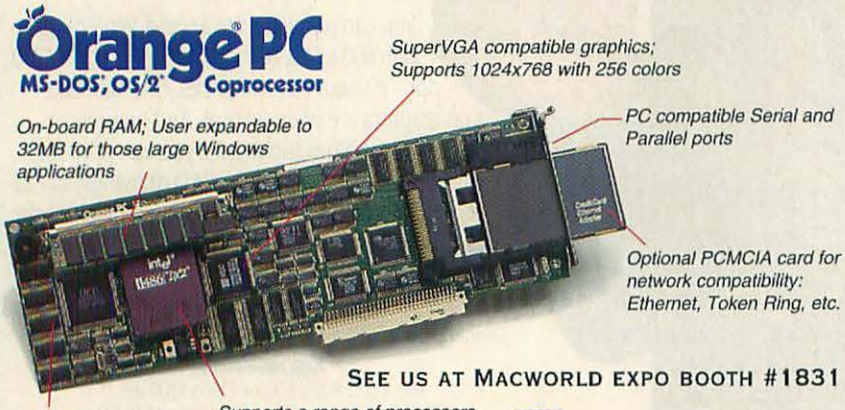

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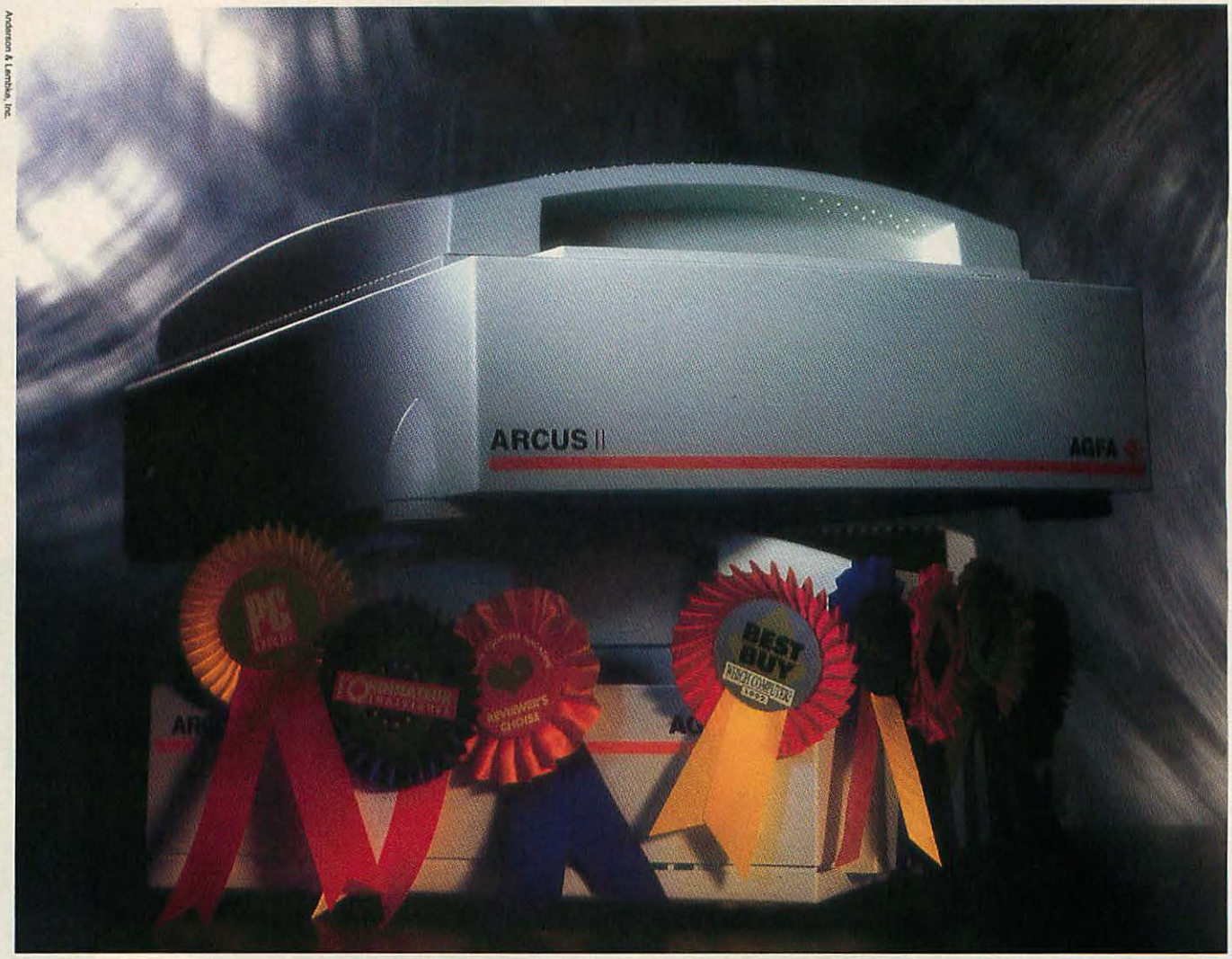

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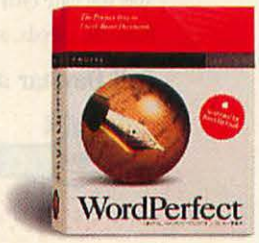

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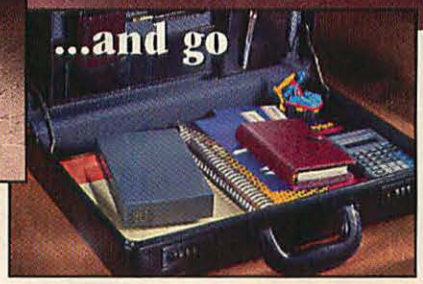

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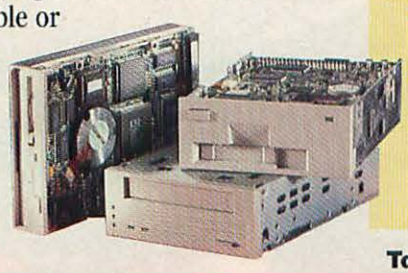

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Circle 52 on reader service card

Macworld

Clue 1: Joule, no compromises

BY ADRIAN MELLO

Power Macs on a Roll

How the Power Macs are picking up momentum

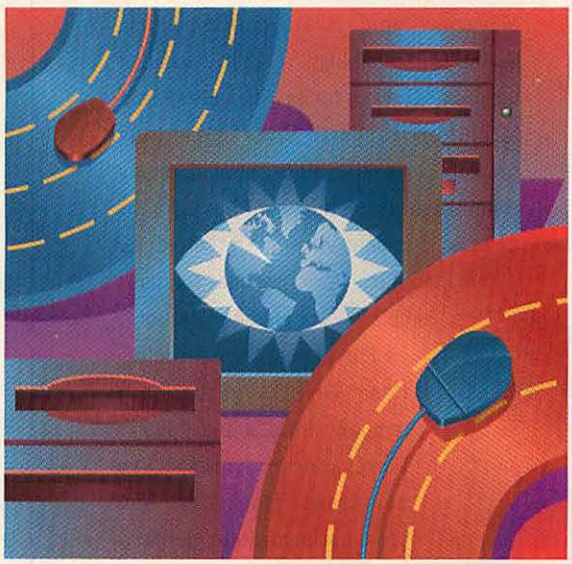
LAST MONTH I POINTED OUT that Apple has been making a lot of good decisions in the past year. Perhaps the most important of Apple's recent achievements is the PowerPC transition. Moving the Mac platform from a CISC-based architecture to RISC was one of the most ambitious technological undertakings in the history of personal computing. Power Mac shipments hit 250,000 units in Apple's fourth fiscal quarter of 1994, and have reached 600,000 since their March 1994 introduction. It looks like Apple will reach—and may even exceed—its goal of shipping 1 million Power Macs in the first year.

One of the best aspects of this transition is that it has permitted a major step forward in performance and technology without causing users a lot of headaches. There have been very few problems, which is remarkable given the magnitude of this change. Emulation has worked well, and most applications previously written for the 680X0 series of processors suffer few if any compatibility problems. Because there are few differences in hardware between the two architectures, other than the change in microprocessors, existing add-in boards and hardware work well with the Power Macs. Apple also provides a fairly compelling upgrade path for most owners who have invested in Mac hardware in the last couple of years, with only narrow exceptions.

All major Mac software packages have now been introduced in native Power Mac versions. We count well over 300 native Power Mac software packages available at press time, and more are coming (see the table "Who Offers Power Mac Software" in "Making the Move to Power Mac," in this issue). Because of this quick adaptation, software availability is no longer an issue for the vast majority of current and potential Power Mac users.

State of the Power Mac

Less than a year after their introduction, the Power Macs have clearly made the grade and have fulfilled all the expectations laid out for them. *Macworld* remains committed to providing you with the best information on the Power Macintosh. As part of that commitment, in this issue we present the first part of a major two-part article on the current state of the Power Mac. Part one lays out all the strategic points needed to help you make the right upgrade decisions (see "Making the Move to Power Mac," by Galen Gruman, in this issue). This feature will help you understand whether or not you should upgrade and what the best upgrade options are for your current model. Also in the article is a comprehensive list of vendors and their products now available for the Power Mac. Now that so many applications are available it's important to follow up and see just how much performance has improved. In our next issue, the second article will present Macworld Lab's findings on the actual performance gains of key native Power Mac applications. This will help you determine which programs to upgrade in your applications library and when to simply save your cash.



In addition to this special two-part article we will continue to cover the Power Mac in every issue. Our *Power Mac News* section will continue to focus on the technological progress of the Power Mac, while in-depth feature stories will provide complete information for making the right product-purchasing decisions. And you can be sure that as new Power Mac models and technologies appear, *Macworld* will provide you with the necessary in-depth information to help guide you through the decision-making process.

What's Next?

Now that the Power Macs have a full head of steam, where is Apple likely to go with the platform in the coming year? Here are five probable developments.

1. PowerPC Everywhere Apple introduced the Power Macs less than a year ago, and it's clear now that they are firmly entrenched. The PowerPC will become ubiquitous across the Macintosh lineup. Power Macs already dominate Apple's desktop business offerings. In the coming year, expect to see complete lineups of PowerPC-based Performas, LCs, and PowerBooks. By 1996 non-PowerPC Macs will likely be a footnote in Apple's product lineup.

2. Faster Power Macs Power Macs will become available with increasingly faster versions of PowerPC chips. The PowerPC architecture has a lot of headroom and is nowhere near its performance ceiling. Users will see faster clock-speed versions of the 601 chip that now inhabits all Power Macs. The first example of this was the 110MHz Power Mac 8100. But don't let that tempt you to play the waiting game: there will always be something faster. If you need to upgrade to a faster model now, a future computer can never go fast enough to make up for the time you would lose by sticking with a slow machine.

3. Widening the Bottlenecks Apple will begin to modify the architecture around the PowerPC processor to provide even greater system-level performance. During the perilous transition to PowerPC, Apple was prudent not to alter the technology that moves data in and out

continues

DION ARDAY

of the Mac and slings it around once it's inside. Now it's almost time for that next stage: in 1995 Apple will ship the first Power Macs based on the PCI peripheral bus (see "PCI Power Mac Preview," *News*, December 1994). The PCI bus will provide a performance boost, but it is also a standard that other computers will share. That should translate into lower costs for peripherals and more options for users.

4. PowerPC Clones Appear The first bona fide Mac clones will be based on the PowerPC and should appear by the end of summer. Apple has said that five or six licensees of the Mac OS will be announced by midyear. It's important to understand the distinction between new vendors of non-Mac PowerPC systems and new licensees of the Mac OS. In the first case, the non-Mac systems are not likely to run the Mac OS unless they are engineered to do so from the start. This is highly unlikely. The point here is that not all PowerPC-based systems will expand the number of installed Macs. Even so, the fact that this alternative chip architecture is gaining licensees means that there is a healthy alternative to the Intel architecture. It's also possible that if the Mac OS is the dominant operating system running on PowerPC hardware, then there will be incentive to take advantage of its many applications.

5. Apple and IBM It seems clear to everyone but Apple and IBM that their cooperation needs to grow. They remind me of a couple who have been dating for a few years but can't quite work out their commitment. I can hear it now: "We broke up over PReP, but it was just too difficult being apart so we worked out a converged platform." Apple and IBM's commitment to develop a converged platform should extend the PowerPC landscape (see "IBM, Apple Move to Joint Platform," *Power Mac News*, January 1995). The benefit to users should be lower costs and more options. With two large players now supporting an alternative hardware standard, it's likely that most other vendors planning PowerPC machines will support the same standard. In fact, FirePower Systems, one of the companies that has designed the first PowerPC systems for several clone vendors, has all but announced its intent to support the converged platform.

Although they've worked out a shared PowerPC hardware platform, Apple and IBM are now squabbling over whose operating system they will put on whose machines. It's as if they decided to get back together but are now arguing over who moves into whose place (they agreed that they should live in the same building but keep separate apartments). Last time I checked, the two said they have an open relationship and they can still date other operating systems.

Don't be surprised to see them warming up to each other's OS over the coming months. I suspect that in the end the pair will work out some sort of joint licensing arrangement that will satisfy both. That probably means IBM will push OS/2-based systems but offer Mac and Windows NT systems to its customers, using Apple's brand rather than an IBM Macintosh clone. Apple will likely sell Macs running NetWare—and perhaps OS/2—as server components for Mac-mostly markets. Apple and IBM have much more to gain by working together than separately. The advantages to working together should become even more compelling as the PowerPC continues to gain ground. In the end, both companies should realize that, for them, this is the only game in town and they'd better make the most of it. **m**

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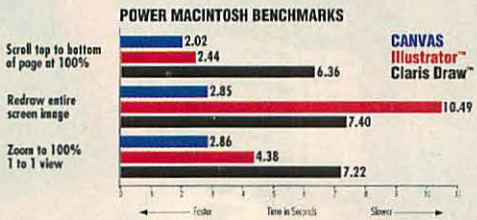

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Apple Peripherals

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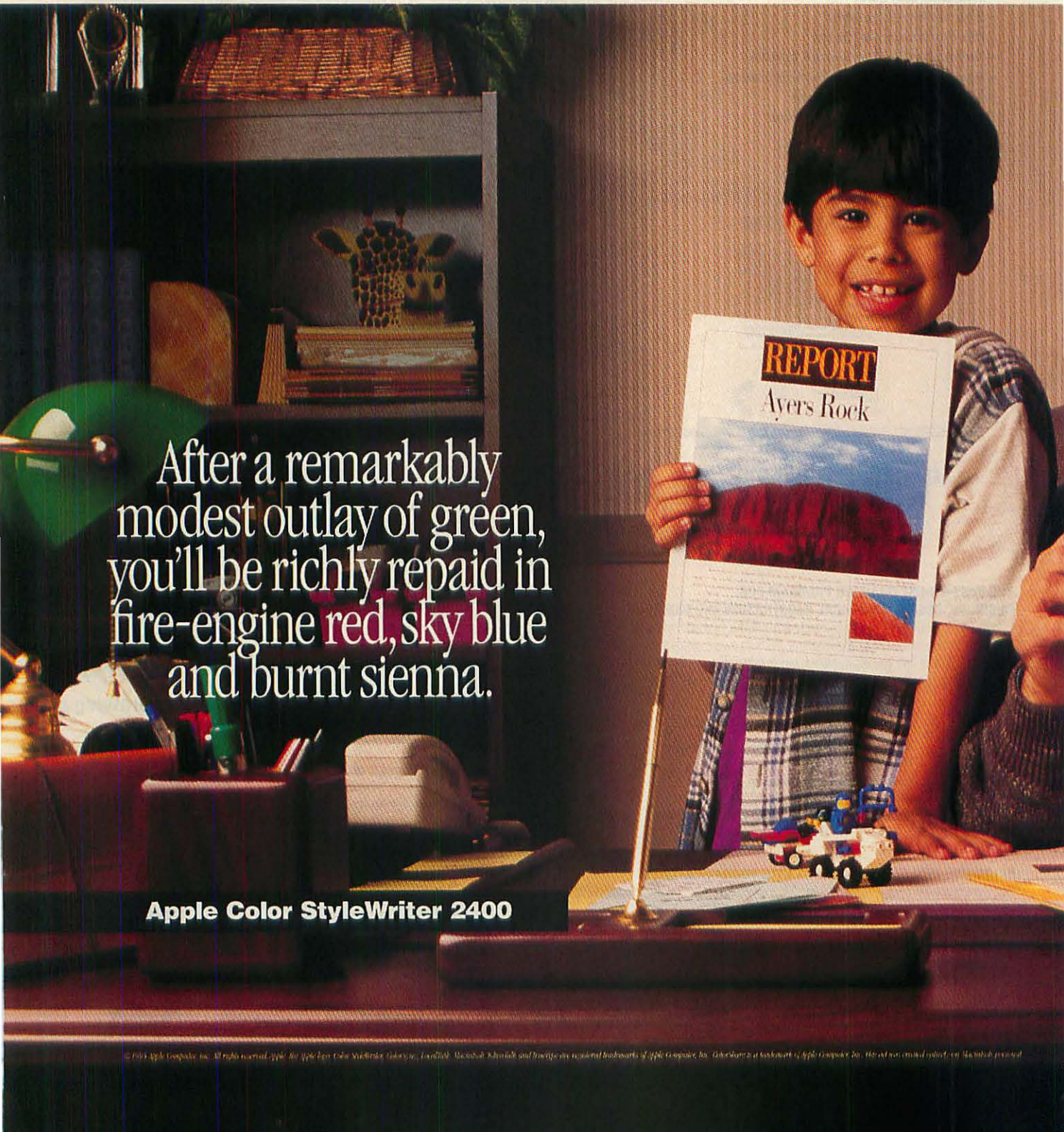

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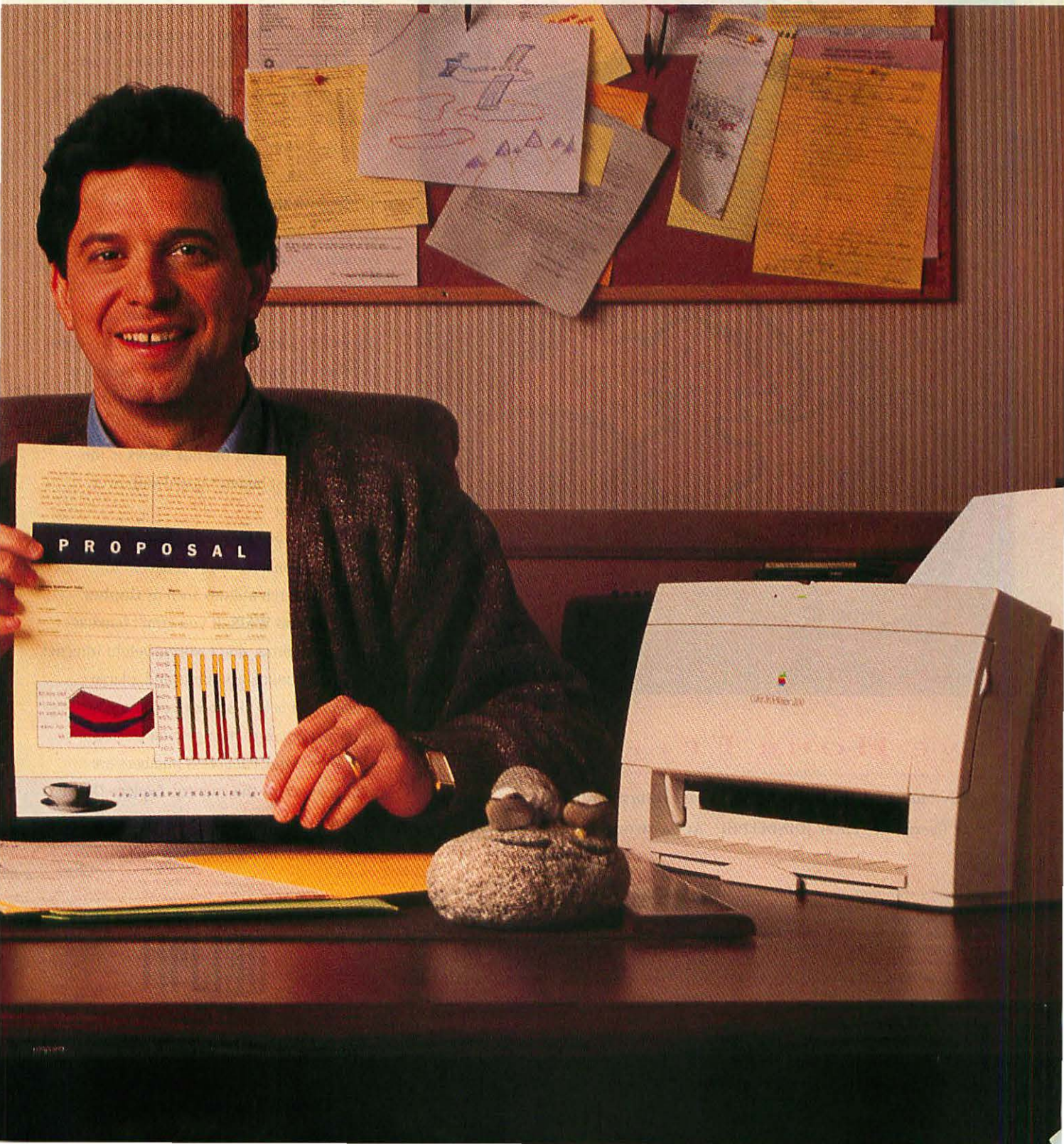
Apple



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Letters

eWorld-Weary

I JUST READ STEVEN LEVY'S COMments about emptyWorld, and I could not have said it better myself (*The Iconoclast*, November 1994). eWorld was great in beta, but since going online I've experienced nothing but bugs and dead space. But maybe Apple is getting the message. Today I discovered I'd been given ten hours of free time, and I no longer pay a surcharge for signing on in prime time.

Paul Martin
San Francisco, California

SINCE STEVEN WROTE THE ARTICLE eWorld has certainly improved, but I log on only rarely. By contrast, I use the Internet almost every day. The signal-to-noise ratio is fairly high, but at least there is signal. If it were my dollars being spent, I'd have all those smart engineers at Apple figuring out how to "Fit In and Stand Out" on the Internet. Proprietary online services are yesterday's news.

Scott Dickson
via the Internet

I DISAGREE WITH STEVEN LEVY ONLY over his assumption that a decent support area in eWorld wouldn't induce people to use the service. Now that Apple's screw-the-dealer campaign has produced its logical result—a drought of technical support at the retail level—the need for knowledgeable help with Macs is greater than ever. 1-800-SOS-APPL is a cruel hoax; I've yet to get through, and neither have my associates. Why hasn't Apple made eWorld a direct-access point where desperate Mac owners could post specific questions and hope to see answers within a reasonable time?

David D'Costa
via the Internet

FOR WHAT LITTLE IT OFFERS, eWorld is too expensive. It's good to see Apple is offering free time to new users, but it's too late and poorly advertised (I found out only after perusing *Macworld*'s message board on America Online). The other crippling feature of eWorld is its lack of free areas. It's criminal to have to pay to check my bill or see how much time I've used. And if I have to run to answer the door in the midst of an online session, logging off and then on again is a real pain.

Rob Narberes
via the Internet

Down-to-Earth DreamNet

AS THE FORMER EXECUTIVE DIRECtor of Computer Professionals for Social Responsibility and current coordinator of The 21st Century Project at the University of Texas, I want to offer congratulations and thanks to Charles Piller for an excellent article on the overhyped "information superhighway" ("DreamNet," October 1994). Thanks also to *Macworld* for funding a useful poll. This will be very helpful for those of us in the public-interest sector trying to build a national network that avoids the brain-dead glop of TV/Hollywood culture.

The article very cogently pointed out the many contradictions of current discussions about the "information superhighway." It was one of the most intelligent pieces I've seen on the subject, and I hope that everyone in Congress reads it. I will be recommending it to my contacts in Washington. The article mirrors most of what I've been saying in public appearances and in my own writing.

When *Macworld* takes on important national issues like education, privacy, and the "information superhighway," you guys do such a superlative job that it makes me all the more angry to see the trash offered elsewhere. The computer field needs a serious and intelligent publication to take on these issues, and although I think *Macworld* covers these things too infrequently, when you do features on public issues they're the best available. Keep up the good work.

Gary Chapman
Austin, Texas

Privacy Prevention

THE CONCLUSION OF KRISTI COALE'S article on software-piracy prevention in the November issue of *Macworld* seemed to place users' privacy rights above the need to protect the company and its assets ("Piracy Prevention"). As a network manager, it is part of my job to protect the company against the proliferation of illegal software. Our employees are informed of all audits, as well as the company's policy against any software not installed by a member of the IS department. Since the computers, the software, and any work performed by employees are the property of the company, there should be no privacy issue.

Network managers should provide users with a copy of the company policy on software installation and software audits. Users need to be made aware that this is a serious matter and that the com-

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CORRECTIONS

- *The January 1995 issue's benchmarks "How the 8100/110 Stacks Up" in* News *and "What PowerPC Offers Entry-Level Macs" in* Power Mac News *had slight rounding errors for the Power Mac 7100/66 and Quadra 800 that understate some performance by 0.1 percent. The corrected scores appear in this month's (February 1995) "Making the Move to Power Mac" feature.*
- *The icon indicating that Macromedia's MacroModel 1.5 is native for the Power Macintosh was inadvertently omitted in the table "3-D Modelers Compared" ("Inside 3-D Modeling," December 1994). MacroModel has been native since April 1994.*
- *Pasco Scientific's Mac65 has a list price of $697 (*New Products, *December 1994).*
- *Also in the December 1994* New Products, *the correct phone numbers for Vision's Edge are 904/386-4573, 800/983-6357, and 904/386-2594 (fax).*
- *Adobe Systems' telephone number is 415/961-4400 ("Adobe Premiere 4.0,"* Reviews, *and "Adobe Illustrator 5.5,"* Star Ratings, *both in December 1994).*
- *In our December feature "Optical Expansion," the author noted that in some cases, companies that offer longer-than-usual warranties have been known to go out of business before the warranties on their products have expired. We did not, however, mean to cast aspersions on any of the vendors of optical drives who offer two-year warranties.*

pany can be heavily fined should the policy be taken lightly. Since putting your employer at risk to this extent can be cause for dismissal, users should welcome an internal audit to guard against such an event. This will allay users' fears and help stop the proliferation of illegal software.

Erich Knaak
Seattle, Washington

Workplace privacy is a tricky problem, encompassing such sensitive issues as what workers keep on their hard drives and whom they call during the workday. Whether a company adopts the rather draconian policy recommended by Mr. Knaak or a more liberal attitude toward office hardware, it's essential that the company clearly state its policy and that the policy be understood by everyone involved. For further reading on this topic, see *Macworld*'s special report "Privacy in Peril," in our July 1993 issue.—Ed.

I WAS DISTURBED BY KRISTI COALE'S statement: "If you detect illegal software, destroy it and then replace it with a legal copy." I have personally experienced times when the company wouldn't buy a particular piece of software for me, and I was forced to buy it for myself with my own money. I would be quite aggravated if the system manager deleted my software just because he couldn't find a company record of its purchase. Why not just ask the employee? He may have the box and the receipt right at his desk.

David W. Griffin
Casselberry, Florida

VALIS's MetaFlo'

YOUR REVIEW OF OUR PROGRAM MetaFlo' stated that there is no Undo in morphing mode (*Reviews*, August 1994). This is incorrect. To undo a morph, you just select the morphed layers and click on Undo from the tool palette. MetaFlo' asks you if you want to reedit the morph points; if you select Yes, the control points are restored along with the control boundaries, and you may edit them and morph again.

Jeff Anderson
The VALIS Group
Tiburon, California

You can undo a morph if you click on Undo in the palette and select Edit in the ensuing dialog box. The confusion arose because neither the Undo command nor the ⌘-Z keyboard equivalent works while in morphing mode.—Ed.

System 7.5

A MONTH AND A HALF AGO I ORdered the System 7 Pro upgrade to System 7.5 through a catalog. For $19.95 this seemed like a fair deal; I was told that System 7.5 probably would not ship for a week or so. No sweat.

A month later I called the catalog company and was told that System 7.5 was indefinitely back-ordered. "Cripes," I said, and canceled my order. I called another mail-order house. They also told me 7.5 was back-ordered, but only for a week. "Fine," I said, "I'd like to order the System 7 Pro upgrade to 7.5."

The man on the phone was quiet for a second, and then asked me when I'd bought System 7 Pro. I couldn't remember. I no longer had the receipt. It didn't seem like that long ago—three, maybe five months?

"Too long," the guy told me. I had to have ordered it after June 1994.

Even though I own System 7.1, for which a $34.95 upgrade to 7.5 existed, the only upgrade I qualified for cost $99.

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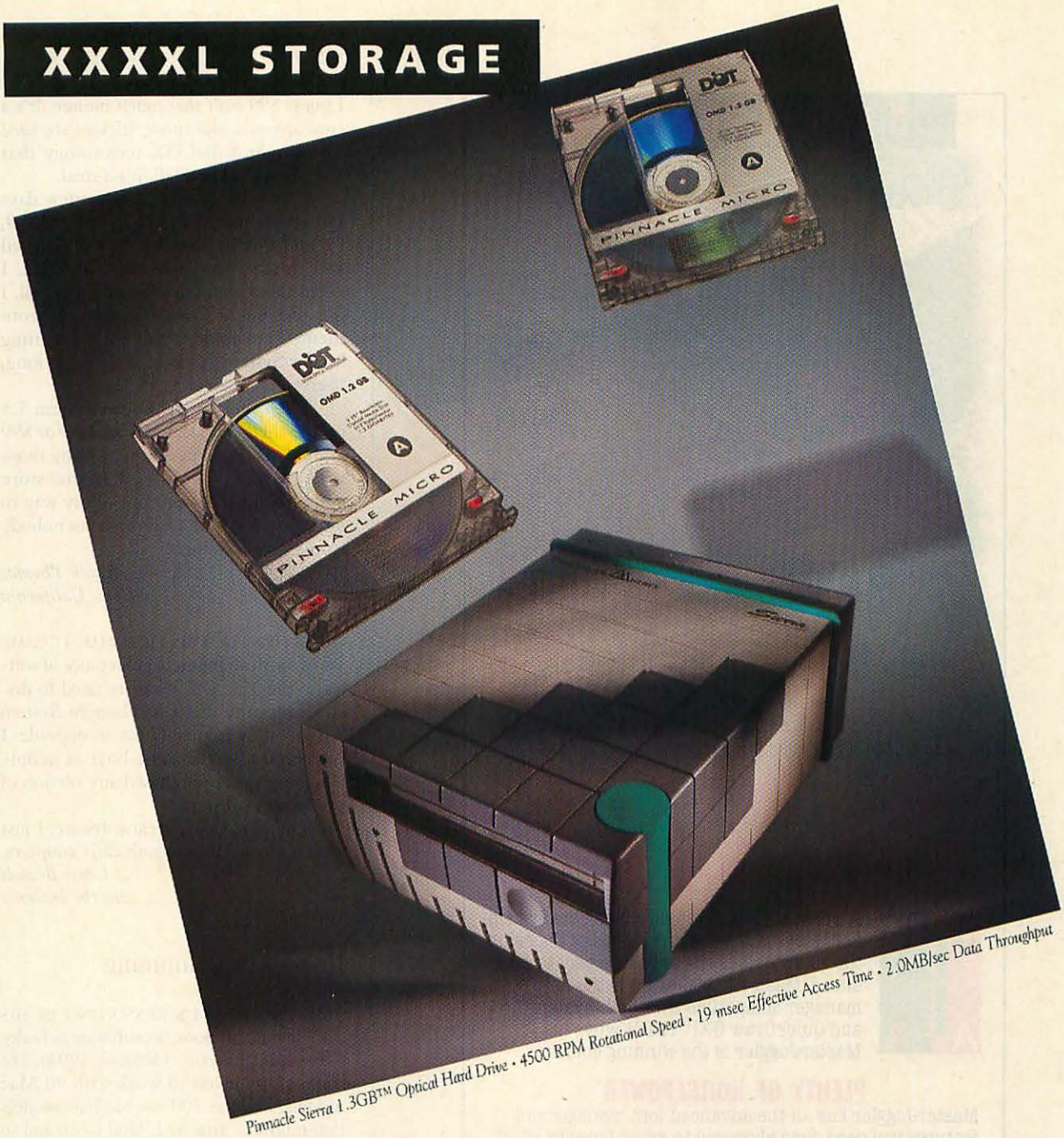

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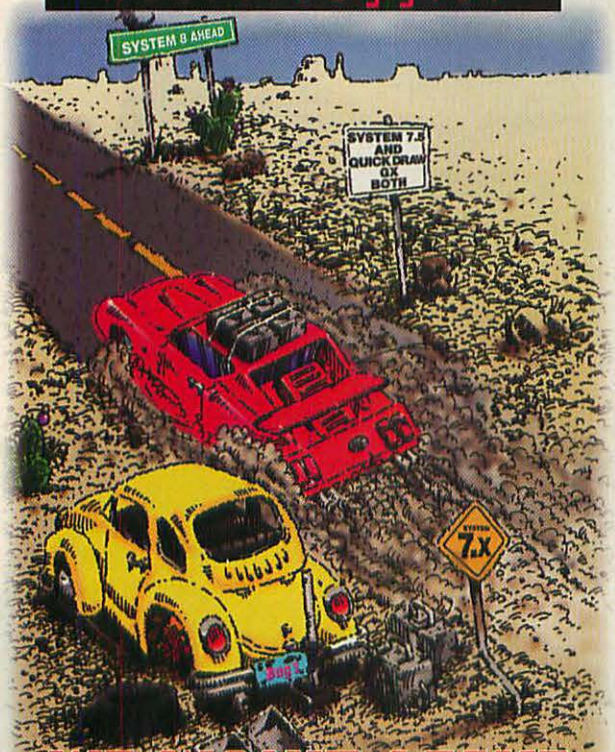
Circle 115 on reader service card

MasterJuggler



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I guess $99 isn't *that* much money. It's a cool upgrade, and those Stickies are hard to beat. And that GX technology that nobody supports? Hell, it's a steal.

I got a letter from Apple a few days ago saying that, for the low price of $99, I could buy System 7.5. When I called and finally got Apple on the phone, I asked them about upgrading—after all, I did just buy a Power Macintosh from them. They told me there was a waiting list for System 7.5 at least a month long. "Screw it," I said.

The other day I noticed System 7.5 on the shelf at a local Mac store. For $99 I could take it home and start using those sticky notes. Instead I left the store empty-handed. I went out of my way to buy System 7.5 for a fair price but nobody would give it to me.

Mark Thomas
Goleta, California

WHEN I GOT MY FIRST MAC, IT CAME with an insanely great piece of software: the Mac OS. I was irritated to discover recently that I had bought System 7.1 too early to qualify for an upgrade. I find myself in the same boat as people who have never purchased any version of the system software.

The Mac OS is great software; I just wish Apple wouldn't insult early adopters.

Chris Brandt
via the Internet

Hellish Programming

DAVID POGUE'S REASONING IN HIS article on poor fax software is faulty (*The Desktop Critic*, October 1994). He states that "it has to work with 90 Mac models, *and* the 200 fax-modem models that might be attached," and so on and so on. If this were an insurmountable problem, not a single DOS or Windows program would work. It has got to be easier to code for the Mac with a modest 90 models, than the PC platform. Such reasoning is just an excuse for poor code.

Shannon Wyatt
via the Internet

Letters should be sent to *Letters, Macworld*, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), eWorld (Macworld), AppleLink (Macworld1), or via the Internet (letters@macworld.com). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*. ■

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SII
Seiko Instruments

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The detail of EPSON's 4800 dpi, scanner really stands

Actual 30-bit scan

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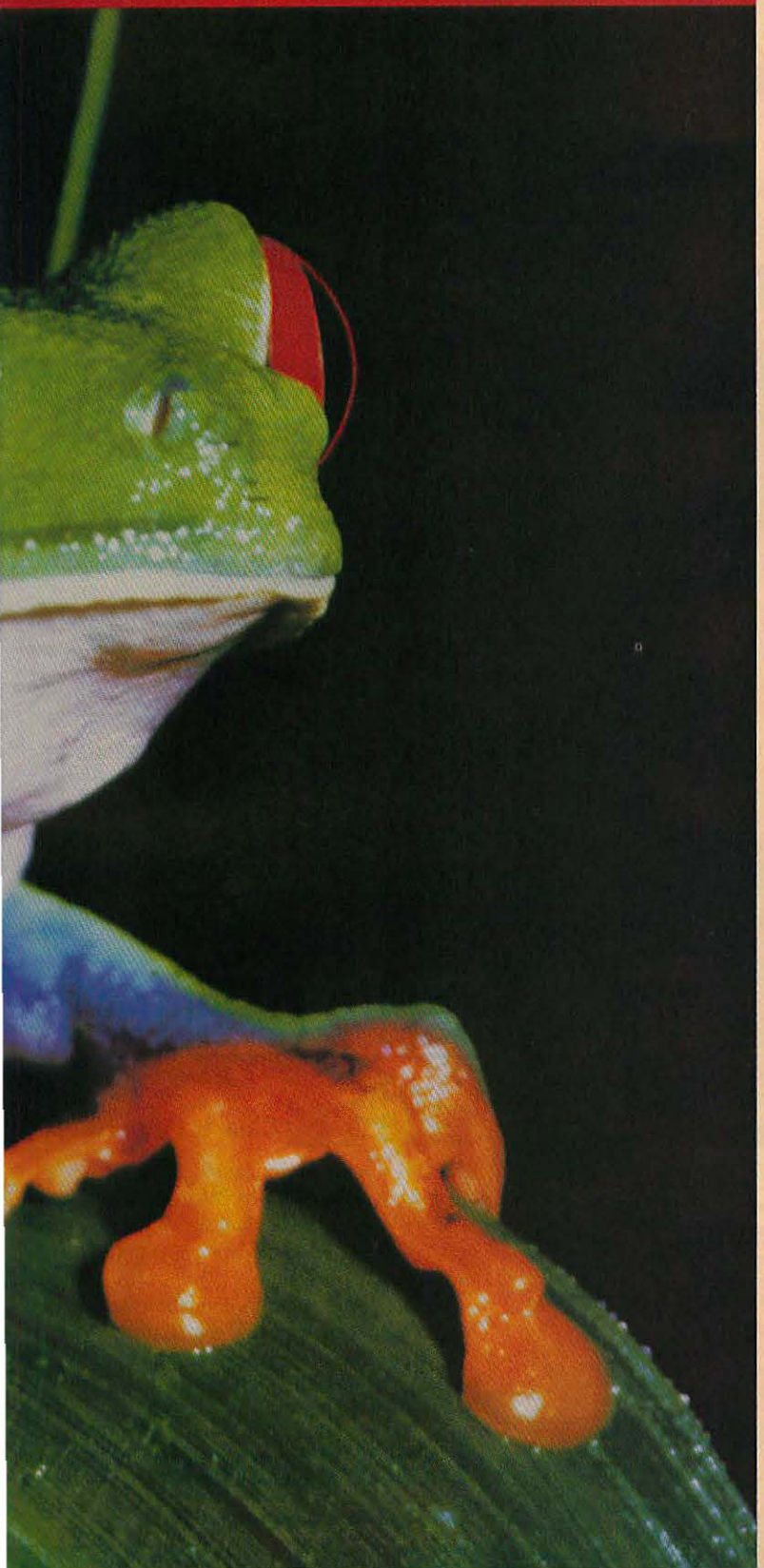
30-bit color out.



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Max Resolution	4800	1600	2400	2400
Bits Per Pixel	10	8	8	8
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Dual Connectivity	yes	no	no	no

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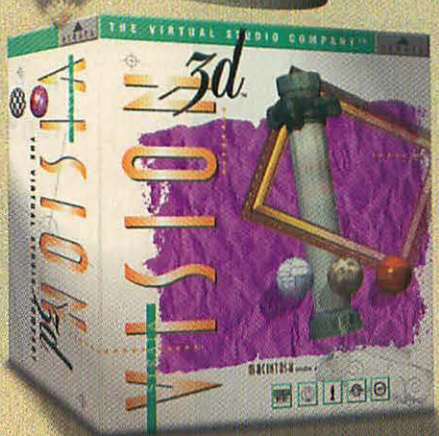

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LATE-BREAKING NEWS

MacBulletin

Apple Demonstrates PCI Power Mac At Comdex in November 1994, Apple demonstrated prototype next-generation Power Macs based on the high-speed PCI bus (see "PCI Power Mac Preview," *News, Macworld,* December 1994). One Power Mac contained the mach64, a PCI graphics accelerator from ATI, a major player in the DOS/Windows market; a graphics accelerator from Radius that uses a Weitek processor; and two Fast and Wide SCSI-2 boards—one from QLogic, the second from FWB—both based on a QLogic chip, according to Apple. Apple is working with 100 potential vendors of Mac PCI products, and 20 companies are doing PCI boards for the upcoming Power Macs. Those 20 are 4-Sight, Adaptec, Asanté, ATI, ATTO, Avid, DCA, DEC, Diamond, Farallon, Fast US, FWB, Harlequin, Hermstedt, Intelligent Resources Integrated Systems, Linotype-Hell, Neutral, QLogic, Radius, and Second Wave.

Pentium Dementium Intel president Andy Grove issued an apology to Pentium users concerned about a flaw in the chip's floating-point division. The flaw is estimated to appear once in 9 billion floating-point divisions, according to Intel. However, some unconfirmed reports indicate that the problem may be much more common. The company said it will resolve the problem for users likely to encounter the flaw, possibly by replacing the chips in their machines. Intel stopped short, however, of issuing a general recall of the millions of Pentiums thought to have shipped with the problem. The math flaw can be demonstrated by dividing 4,195,835 by 3,145,727, then multiplying the quotient by 3,145,727. The Pentium wrongly returns 4,195,579. Intel said it has fixed the problem, but that fixed chips are probably not yet appearing in systems. Concerned users can call Intel at 800/628-8686.

Migrating PowerBook Memory Apple has confirmed that the memory in the PowerBook 500 series will be compatible with the forthcoming PowerPC upgrades for these notebooks. Previously, Apple said it was unsure whether it could guarantee compatibility, since it had not completed its design of the PowerPC upgrade card. Apple only recently determined that the PowerPC 603 CPU in the card had sufficient cache to work with the PowerBook 500 series' RAM. Apple is expecting to ship the cards in late spring or summer, but it will not comment on other details. 408/996-1010.

Front-runner Apple: "We'll Make More" Apple was the leading vendor of personal computers in the critical U.S. market during the third quarter of 1994, shipping 641,492 systems, according to industry analyst Dataquest. Apple, which does not release exact sales figures, said that demand for the 630 family, the PowerBook 500 series, and the Power Mac line was strong, and that Apple should meet its goal of shipping 1 million Power Macs in their first year. Apple said that because of strong demand for Macs, it is planning a new, 200,000-square-foot logic-board factory.

Hayes Files under Chapter 11 Modem and communications-equipment manufacturer Hayes Microcomputer Products has voluntarily filed for protection from creditors under Chapter 11 of the U.S. bankruptcy laws. According to the company, the move was precipitated by a "short-term cash shortage," and business would continue as usual, with Hayes meeting its production-schedule, product-delivery, and customer-service commitments. The company plans no layoffs.

Axion Unnerved? Teleconferencing-equipment vendor Axion's phone numbers for sales and tech support and its 800 number had all been disconnected at press time. ■

News

EDITED BY TOM MORAN

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Word 6.0 Performance Disappoints

RICHARD DOWNS

By most accounts, Microsoft Word 6.0 for the Macintosh is a tour de force of new features and improvements. But accessing those additional features smoothly and efficiently may require more Macintosh than most users have.

Microsoft recommends a Mac with a 68020 or better processor, at least 4MB of RAM, and 24MB of disk space for a complete installation of Word 6.0. But many users of 68030-based Macs say the application is too slow for them. Users of 030-based Macs make up about half the entire Mac installed base, according to the market-analysis newsletter *Hartsook Letter* (published by Pieter Hartsook, Alameda, California). And some of those users are removing Word 6.0 from their hard drives and returning to version 5.1 until Microsoft improves Word 6.0's performance.

Slowdown Shown

Macworld Lab tests show that Word 6.0 performs at about half the speed of Word 5.1 in many everyday tasks (for more on Word 6.0, see *Reviews*, in this issue). We tested Word 6.0 on a Centris 650 that had only basic Apple extensions. Saving a 44-page file with some graphics in it took twice as long in the new version, as did printing to a PostScript file. Performing an exact word count in Word 6.0 took 30 seconds longer than it did in Word 5.1.

In response to complaints about slow performance, Microsoft has released a document called *Setup and Performance Optimization*, which is available from online services or by calling Microsoft directly. The 8-page document advises users to add RAM to their systems, reduce the Memory control panel's disk cache setting to 32K, reduce the number of colors the monitor displays, limit the number of installed extensions, and create a RAM disk.

Microsoft says the performance slowdown is a direct consequence of the new Word's larger set of features and improvements, which the company says users have requested in the two years since Word was last updated. Another reason given for the problem is the switch from having separate code for the

Mac and Windows versions; the two versions now use the same code, developed first for Windows. "We had to make some hard choices," explains Martina Lauchengco, product manager for Word 6.0. Microsoft decided that the performance penalty for the new features was acceptable because the company believes most 030-based Mac owners will upgrade to faster Macs in the next few years. But other recently upgraded programs with lots of new features don't show such a slowdown, including Microsoft's own Excel 5.0 and rival Novell Application Group's WordPerfect 3.1. However, during the transition from Word for Windows 2.0 to version 6.0, users of 386 machines had similar performance problems.

Launch Delay One of the worst delays with 6.0 occurs when a large number of extensions and fonts are installed—loading the Word 6.0 application can take several minutes. On a Centris 610, the launch time was more than 7 minutes, compared with about 2 minutes for Word 5.1. On the same system, the new Excel 5.0 did not show a corresponding slowdown compared with version 4.0. Other Macintoshes tested did not show a similar slowdown during the launch of Word 6.0. Microsoft confirms that certain extensions and fonts can cause a slowdown at launch, although it has not yet identified which extensions cause the problems. The company hopes to make a list of the extensions that affect Word 6.0 performance available by the time you read this. Fonts play a part because Word 6.0 checks each font as it launches to see if it is corrupted.

For users who choose to revert to Word 5.1, Microsoft said it is offering a free filter for Word 5.1 that lets it read Word 6.0 files. The filter is available from Microsoft directly and also from online services. Microsoft, 206/882-8080.—MATTHEW HAWN AND JOANNA PEARLSTEIN

Apple's Secret PowerBook Plans

According to sources close to Apple and internal Apple documents obtained by *Macworld*, Apple's first line of PowerPC PowerBooks is slated for a May or June announcement. Later in the year, these machines should be followed by a PowerPC Duo and, according to one source, the previously announced PowerBook 500 PowerPC upgrade card.

PowerBook Redesign

The M2 PowerBook line is expected to have a more rectangular look than the curvy 500 series. Important features include: **(1)** a built-in PCMCIA slot, **(2)** an infrared transceiver on the back panel, **(3)** a media bay that will accept either a floppy drive or a special CD-ROM drive that takes 3.5-inch discs, and **(4)** a single, lithium-ion battery with LEDs indicating charge status. Artist's concept.

Documents obtained by *Macworld* indicate that Apple's next line of PowerBooks will be based on the PowerPC 603+ chip, which should offer significant speed benefits to the PowerBook family.

New Case Design and More Code-named M2, the new line of PowerBooks will use the specially designed PowerPC 603+ chip with a 32-bit data path, probably running at 100MHz (see "PowerBooks May Face Delay," *Power Mac News*, *Macworld*, September 1994). Sources close to Apple say that Apple plans three versions of the M2, one with a 10.4-inch active matrix LCD color screen, one with a 10.4-inch passive matrix LCD color screen, and one with a 9.5-inch passive matrix monochrome screen. The 10.4-inch screen, popularized by IBM's well-received ThinkPad notebooks, has been scarce, but major suppliers are expected to ramp up production in 1995. The 10.4-inch size would give the PowerBook a viewable display area close to that of a regular 14-inch monitor. All three machines are expected to ship with at least 8MB of RAM on the motherboard, expandable to 64MB, and back ports, including SCSI, ADB, video in, audio in and out, and a single serial port, but excluding the Ethernet port and modem expansion slot. According to our sources, Apple will use IDE hard drives in the M2 PowerBooks, but it's not clear what capacity drives will eventually ship.

The M2 machines will inherit their keyboard and trackpad from the 500 series, but little else, according to a source close to Apple. The new PowerBooks will sport a media bay where customers can plug in either a floppy drive or a specially designed CD-ROM drive that uses 3.5-inch discs; the internal Apple documents further indicate that Apple has been investigating adding PCI capability to the media bay. Other changes include a built-in PCMCIA slot (for one Type III or two Type II cards) and an infrared transceiver on the back panel that will provide wireless LocalTalk connections and support for Newton transmissions (see "Spindler Says Clones on the Way," *News*, November 1994).

According to our sources, Apple will ship the M2 with a new, lithium-ion battery.

continues on page 40

In Brief

PLI Reorganizing

Peripheral Land Inc., longtime vendor of storage options for the Macintosh, is undergoing financial difficulties and may be acquired by Eyetel Technologies, according to a PLI executive. PLI has restructured its debt and made cost reductions to continue operating, the executive said. The company, which once employed 189 people, recently had an additional layoff of around 15 percent to 20 percent of staff, to a current level of 70 employees.

SoftWindows for Quadras

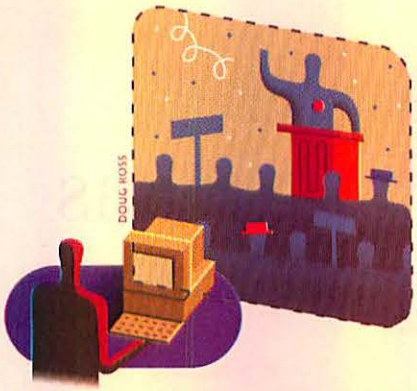
Insignia Solutions is shipping a version of SoftWindows, its Windows-emulation software, that runs on 040-based Macs. The software runs DOS and standard-mode Windows applications but does not run enhanced-mode Windows apps. To run SoftWindows for Macintosh version 1.0, the company recommends 16MB of RAM. To run Windows and DOS requires at least 23MB of free disk space. The $499 software can read PC CD-ROMs, and it emulates PC serial ports and a printer port. It comes with Novell NetWare client software. 415/694-7600.

Spigot Runs Millions of Colors

Radius is bringing out the Spigot AV Producer, which supports 24-bit digital video capture and playback at 30 frames per second (60 fields per second) for NTSC or 25 frames per second and 50 fields per second for PAL. The Spigot AV Producer has more colors, less banding, and fewer dropped frames than previous Spigots, the company says. It works with QuickTime 2.0, JPEG compression, JPGI (to support DigitalFilm files), and X Commands for use with Macromind Director. The board, expected to list for $1799, fits in the DAV slot of AV Macs, and should begin shipping in January.

Democracy Online

FUTURE CAMPAIGNS?



Tired of endless lies from politicians? Certain that campaign financing rules the land? Well, you may not have to take it anymore if the promise of several online democracy projects comes true.

The California Online Voter Guide, a project of the California Voter Foundation, is one example. During the November 1994 state election, voters could access the service and find out about nine statewide races, the candidates involved, the issues, and the platforms of the six political parties in California.

Accessible through the Internet, America Online, or the World Wide Web, the service offered in-depth information, including biographies of the candidates, endorsements, position papers, and speeches. With online information, voters can educate themselves and get to know the issues in much more depth than is possible with other media. Also, when more voters get their information from voter-information services, it will level the playing field for candidates who may not have the money for a large campaign, said Kim Alexander, executive director of the California Voter Foundation. These kinds of services may be the best road to campaign finance reform, according to Alexander.

The Democracy Network, put together by the Center for Governmental Studies in Los Angeles, is another project intended to bring more light to bear on the election process. It adds interactive multimedia to the mix, with an application that voters can use to see candidates' speeches, to hear their positions on various issues, or to access commentary by consumer groups or other resources. The software can run on a computer, or on a cable TV hookup if the cable company has installed The Democracy Network. Several such pilot projects are currently under way. Funded by national foundations, The Democracy Network also received some Macs from Apple.

The California Online Voter Guide and The Democracy Network are both available along with related services on the Political Participation Project World Wide Web page, which can be reached at http://www.ai.mit. edu/projects/ppp/home.html. The Center for Governmental Studies, 310/ 470-6590; The California Voter Foundation, 916/737-6270.—T.M.

BUGS & TURKEYS

If you own a Radius Thunder IIGX 1600 graphics-acceleration card, you might have noticed that the CMYK plug-in that ships with Adobe Photoshop 3.0 doesn't work. If you happen to use this configuration on a Power Mac, you'll find that the DSP plug-in conks out, too. Radius says a free fix will be available by late November from its tech-support line (408/541-7680) and from online services such as America Online, AppleLink, and the Radius BBS.

QuarkXPress 3.3 and System 7.5 are like two kids that just can't play nicely—users have reported conflicts when faxing or printing composites and halftones. And did we mention that XPress won't read files on locked media? A free patch—3.31r2—repairs these and other Quark quirks. The 680X0 version is available online; the Power Mac version is available (with a valid serial number) only from Quark, 303/894-8888.

First Apple stopped shipping system disks with certain Macintosh models, now it's leaving out the manuals. System 7.5 ships with a slim booklet called the *System 7.5 Upgrade Guide*, which highlights new 7.5 features. Anyone upgrading from System 6 must rely on Apple Guide, Apple's online help, which Apple says covers "three-fourths of the features of System 7.5."

Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-Shirt if we shoot your turkey in this space. See *How to Contact Macworld.*

Sony's 17-Inch SOHO Monitor

NEW TRINITRON DESIGN

Adding to its highly regarded Trinitron monitor line, Sony has brought to light the Multiscan 17sf, a 17-inch flat-screen digital display that Sony says is designed to suit the requirements of business buyers while still fitting the budgets of small-office home-office (SOHO) users. Based on redesigned Trinitron tube technology, the Multiscan 17sf monitor lists for $999.95, but Sony expects the street price to be around $899. With its all-new Trinitron tube, the display is several inches less deep than most competing 17-inch monitors. The Multiscan 17sf includes Sony's new 0.25mm Super Fine Pitch aperture grille.

At press time, Sony expected to ship the Multiscan 17sf beginning on November 15. The company is already offering the Multiscan 15sf, a 15-inch digital monitor with basically the same features as the Multiscan 17sf, including front-panel digital controls, tilt-and-swivel base, Digital Multiscan technology, mostly automatic geometric adjustment, maximum resolution of 1024 by 768 pixels at 75Hz, and two factory-set white points (5000 and 9300 degrees Kelvin) with one user-chosen setting. The Multiscan 15sf carries a suggested list price of $569.95.

The Multiscan 17sf is a flat-screen Trinitron display that lists for just under $1000.

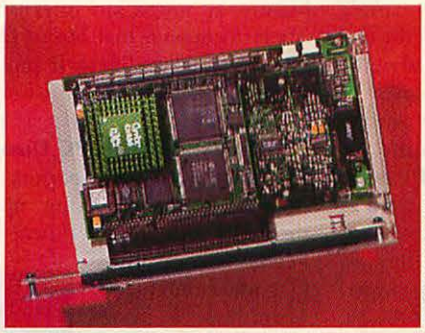
Sony also recently introduced the CPD-1425, an analog 14-inch Trinitron monitor intended as a low-cost solution at a list price of $399.95. The CPD-1425's maximum resolution is 1024 by 768 pixels, its tube has a 0.25mm stripe pitch, its refresh rate is 75Hz at 832 by 624 pixels, and it's available now. It syncs to several preset

frequencies but is less versatile than the sf-series monitors, which can sync to any video signal from a graphics board. To work with Macs, all three of the Sony monitors require the company's $18.95 MacView adapter, all three have silica antiglare coating, and all three comply with Energy Star and VESA DPMS power-management standards and with the MPR 1990:8 (formerly MPR II) guidelines for electromagnetic emissions. Sony, 800/352-7669.—T.M.

PC Cards Now Offered for 040 Macs

PC VENDOR LICENSES APPLE TECHNOLOGY

Pushing forward with its multiple-operating-system strategy, Apple has licensed the software and hardware technology from its DOS Compatible Card to another company for use in PC coprocessors for most 040 Macs. The unusual move by Apple meant that in mid-November 1994, Reply Corporation began shipping the DOS on Mac PC coprocessor card, based on this licensed



RICHARD RETHEMEYER

Reply's DOS on Mac card adds a PC to many Macs.

technology, for the Centris and Quadra 610. (This card can also be used in a Centris or Quadra 660AV, but you must remove the AV card.) Cards for the Centris 650 and Quadra 650, 700, 800, 900, and 950 are expected to ship in January 1995. Reply is known in the PC market for its IBM PS/2 motherboard upgrades. The Reply card for the 610 fills the void left when Apple discontinued its DOS Compatible Card for the 610 in March 1994 after two and a half months, because Apple's supplier ran out of the necessary parts.

For the other supported 040 Macs, the Reply cards mark the first direct competition against Orange Micro, which has several PC coprocessor cards in its OrangePC line. The existing OrangePC cards work in any NuBus Macintosh (including 680X0 and Power Mac models), while the Reply DOS cards plug into the Mac's Processor Direct Slot. Using NuBus slows down the Orange Micro cards but lets them plug into a wide range of Macs; using the Quadra PDS lets the Reply cards run faster than otherwise equivalent-speed OrangePC cards but limits the cards to working only with the Centris 610 and 650 and Quadra 610, 650, 700, 800, 900, and 950.

The Reply cards have one SIMM slot that uses the same 72-pin SIMMs as a Quadra and most PCs; if no SIMM is installed, the card uses the Mac's RAM—just as Apple's new DOS Compatible Card for the Power Mac 6100 does (see *Power Mac News*, *Macworld*, January 1995). The Reply cards use the same software as Apple's card. And the SoundBlaster-compatible daughtercard bundled with the recent Apple card is a $95 option for the Reply cards. Also optional for the Reply card is NetWare IPX and Unix TCP/IP networking support, which Reply expects to make available in January. Apple includes this software with its card.

The cards will be available with a choice of a 50MHz 486DX2 or a 66MHz 486DX2 CPU. The initial supplier of the CPUs will be Cyrix Corporation, although Reply says that this will change as the primary PC CPU suppliers—Intel, Advanced Micro Devices, Cyrix, and NexGen—adjust their prices. (Apple is currently using Intel's 66MHz 80486DX2 processor.)

Reply's basic card for the 610 costs $495. The basic card for the other 040 Macs costs $495 for a 50MHz card and $595 for a 66MHz card. The SoundBlaster daughtercard costs $95, and the networking software, $50. MS-DOS 6.23 and Windows 3.11 are included. Reply, 408/942-4804.

—GALEN GRUMAN

THE AMCOEX INDEX OF USED MACINTOSH PRICES

Machine/RAM/Hard Drive	Average Sale Price	Monthly Change
PowerBook 100/4MB/20MB	$575	$0
PowerBook 140/4MB/40MB	$725	–$25
PowerBook 180/4MB/80MB	$1550	+$50
PowerBook Duo 230/4MB/80MB	$800	–$25
Mac Classic/2MB/40MB	$325	–$25
Mac SE/30/2MB/40MB	$475	–$25
Mac LC II/4MB/40MB	$525	+$25
Mac IIsi/3MB/40MB	$525	–$25
Mac IIci/4MB/80MB	$650	–$100
Mac IIfx/4MB/80MB	$850	–$25
Centris 650/8MB/230MB	$1300	+$100
Quadra 900/8MB/160MB	$1925	+$75

Index provided by the American Computer Exchange of Atlanta (800/786-0717). It reflects sales during week of November 20. Configurations include keyboard and exclude monitor and display board for noncompact models.

In Brief

StuffIt Deluxe 3.5

StuffIt Deluxe 3.5 helps users by automatically recognizing and expanding files compressed with such exotic cross-platform formats as BINHEX, UUencode, Unix Compress, gzip, and ARC. Users can stuff a document by dragging it from the desktop to an open archive window; to unstuff it, just reverse the procedure. In related news, Aladdin also updated its background hard disk compression package, StuffIt SpaceSaver, adding a tighter compression algorithm. StuffIt Deluxe 3.5 ($129.95) and StuffIt SpaceSaver 3.5 ($79.95) are now both accelerated for the Power Mac and are available from Aladdin Systems. 408/761-6200.

Color StyleWriter Pro Watch

Although it's not yet official, Apple is preparing to switch its production from the existing Color StyleWriter Pro printer to the newer Color StyleWriter 2400, depending on demand. An Apple representative said both products will remain in the company's offerings until it becomes clear there are not enough orders to justify making the Color StyleWriter Pro. Early demand favors the newer 2400, but there is still a healthy call for the Pro.

DEClaser 3500

Digital Equipment Corporation has begun shipping the DEClaser 3500, a 12-ppm network laser printer that produces 600 dpi, includes PostScript Level 2 and PCL 5 emulation, and has 53 built-in fonts. The DEClaser 3500 switches to the page-description language required by an incoming file and has multiple ports that are active simultaneously. It can hold from 3MB to 19MB of RAM and offers memory-management capability that reduces RAM requirements. The Macintosh version lists for $2099; an optional PostScript fax option goes for $349. 508/493-5111.

"POWERBOOK PLANS" *continued*

There will be space for only one battery on the new PowerBooks, but the lithium-ion batteries already in use in PC portables are lighter, more powerful, and recharge more quickly than their nickel-cadmium or nickel–metal-hydride counterparts. According to one source, the new batteries will have five LEDs that will light up to indicate charge status when the user presses a small button on the battery. Our sources also say that the M2s will use a new, 36-watt power supply similar in design to the current Duo power supply.

A source close to Apple describes the M2 as being physically similar to the 500 series, but not as curvy. The bottom half of the computer is thicker, and the area around the trackpad doesn't slope off but is more square. The display portion of the M2 clamshell is thinner than the 500 series' and basically flat, with a single speaker centered below the display screen. The infrared transceiver will be mounted next to the I/O ports on the left end of the PowerBook back plane.

The Last 040 PowerBook At the same time as the M2 series' release, sources say, Apple will unveil the last 680X0 PowerBook, appropriately code-named the Omega. The Omega will be practically an extension of the M2 line, the major difference being its CPU, a 33MHz 68LC040. The Omega should ship with a 9.5-inch passive matrix LCD screen with 16 levels of gray, a 160MB IDE hard drive, and possibly with only 4MB of RAM. The Omega will have the same ADB, SCSI, serial, and stereo-out ports; and the same infrared capabilities, media bay, PCMCIA slot, keyboard, trackpad, and case design as the M2 line. Also, the Omega is expected to ship with a nickel-cadmium battery, although the internal Apple documents that *Macworld* has obtained indicate it will support the new lithium-ion battery type.

The First PowerPC Duo In the subnotebook category, Apple will be punching up the Duo line with a PowerPC machine currently code-named AJ. According to our sources, the machine will use the 603+ chip and ship with an 8.4-inch active matrix color LCD display, a 500MB IDE hard drive, and according to one source, 8MB of RAM. Apple announced earlier this year that there would be a PowerPC upgrade path for Duo 280 and 280c owners (see "PowerBooks: The Next Generation," *Macworld*, July 1994). The AJ is not expected to ship until the end of the summer or perhaps even early fall.

Also expected to ship in 1995 is the PowerPC upgrade card for the PowerBook 500. Sources close to Apple indicate that the card, code-named Malcolm, would not hit with the M2/Omega introduction, but that it may instead appear at the same time as the PowerPC Duo, AJ. For information about Apple's portable plans for 1996, see "Just Wait Till Next Year," at left. Apple declined to comment.—CAMERON CROTTY

Just Wait Till Next Year

APPLE PLANS EVEN MORE POWERBOOKS

A visionary looking at the Apple Portable Division crystal ball for the next year would see two words: *PowerPC* and *docking*. According to internal Apple documents obtained by *Macworld*, Apple has two major projects in the works for 1996. The first, code-named Nautilus, would be a notebook Mac driven by a 133MHz version of the PowerPC 603+ and would have a PCI bus. Apple's design goals for the Nautilus include three models, all with color screens and a complete array of ports, possibly replacing SCSI with the high-speed FireWire interface (see "Will FireWire Replace SCSI?" *News*, *Macworld*, March 1994). Apple's early plans call for a PCMCIA-based internal hard drive as well as a PCMCIA expansion slot, and a redesigned keyboard and floppy drive that will lead to a thinner, lighter unit. According to the documents we obtained, Apple is investigating at least two docking styles for the Nautilus; one dock concept would use the FireWire port to connect to a desktop station, while a second would provide full port replication à la Duo Docks.

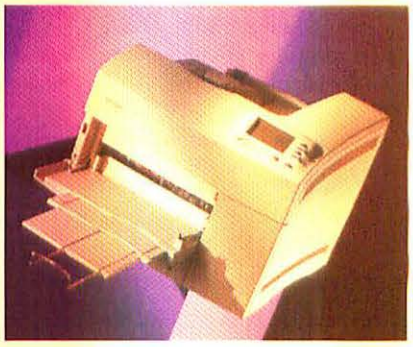
Even further into the portable future is a project code-named Argonaut, a high-performance portable that is scheduled to have a second-generation PowerPC architecture and is intended to replace the M2 and Omega PowerBooks (see "Apple's Secret PowerBook Plans," *News*). Extremely preliminary design specs include a PCI bus, PCMCIA support, an M2-style media bay, docking functionality, security software in ROM, and a case derived from the M2.—CAMERON CROTTY

1200-dpi Printer Values

LEXMARK'S LATEST

If you're looking for more dpi for your dollar, the Optra line of 1200-dpi laser printers from Lexmark International may fill the bill. The five printer models range in cost from $1749 to $3699 for base models—with optional 40MB hard disk, flash memory, RAM upgrades, extra paper trays and drawers, and special paper handling (such as two-sided printing) available at additional cost.

The printers run 1200-by-1200-dpi jobs at 8 pages per minute. Lower-resolution jobs print faster: the Optra R ($1749) and Optra L ($2299) print 300 dpi and 600 dpi at 12 ppm; the Optra Rx ($2399), Optra Lx ($2999), and Optra Lxi ($3699) run those jobs at 16 ppm. The models also differ in duty cycle, paper supply, paper-handling potential, and amount of RAM (all models have room for 64MB of RAM). The durable, high-end Lxi can print on challenging card and paper stocks up to 185-pound stock.



Lexmark's $1749 Optra R prints 8 ppm at 1200 dpi or 12 ppm at 300 dpi or 600 dpi.

All five models have Lexmark's emulation of PostScript Level 2 and Enhanced PCL 5. All automatically switch between PostScript and PCL 5 emulation, juggling fonts and printer settings.

The Optra models all have two network-adapter slots, so they can connect to more than one network at once. The Optra Lxi has Ethernet built in. Adapter cards are available for Ethernet ($439 to $499), Token Ring ($649 to $699), and LocalTalk ($299).

All the Optra printers meet Energy Star power-conservation guidelines.

Lexmark also announced MarkVision for Macintosh, a printer-management utility that runs on a Mac and lets network administrators manage all aspects of networked Lexmark printers, and some aspects of printers from other manufacturers. Lexmark International, 606/232-2000.

—NANCY E. DUNN

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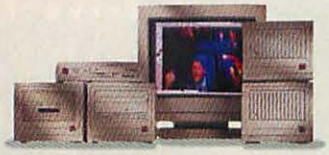

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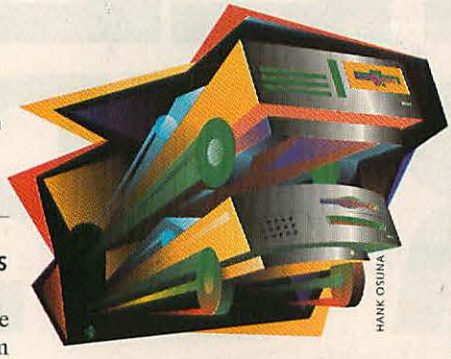
Power Mac News

Power Mac vs. Pentium PC

8100/110 WINS SOME, LOSES SOME IN SPEED TESTS


HANK OSUNA

The first Power Macs were faster than their Pentium PC competitors, but it's only recently that Pentium PC designs have stabilized and Pentium-aware software has begun shipping (Adobe Photoshop 3.0 is an example). With these changes, does the new 110MHz Power Mac 8100/110 stand up to one of the fastest 90MHz Pentium PCs?

According to Macworld Lab tests, the answer is, surprisingly, not always—a Power Mac 8100/110 is slower in 7 of our 14 real-world high-end tasks than a Micron Technology P90PCI PowerStation Pentium-90 system, which leading PC-oriented magazines widely rate as one of the top performers. A Power Mac is faster in 6 tests. The benchmark chart "How the Top Power Mac and Pentium PC Compare" shows Macworld Lab's findings using the latest versions of key programs.

Previous Macworld Lab tests on an Intel-manufactured prototype 90MHz Pentium PC showed the PC to run roughly at the speed of a 66MHz Power Mac 7100/66 (see "90MHz Pentium," *Power Mac News*, *Macworld*, June 1994). What has changed? Foremost, Pentium PCs are now stable in their design, and the optimizations in motherboards, system buses, and other components are showing their worth. Second, developers are starting to optimize their programs for Pentium CPUs. On the Power Mac, key parts of the Mac Operating System in System 7.5—such as those dealing with disk access and other peripheral input/output—are still 680X0 code running in emulation, which slows them down considerably.

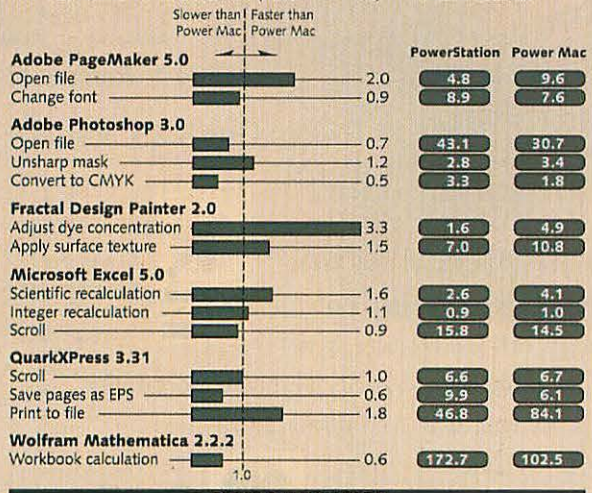
Depending on what part of the computer a task depends on most heavily, performance will vary even within the same program depending on what platform you use. Perhaps the most striking example of this is with QuarkXPress 3.31. Printing to file uses a great deal of disk I/O, so System 7.5 becomes a bottleneck on the Power Mac. But saving a page as an EPS file uses more CPU resources, so the Power Mac's faster CPU gives it the edge.

Keep in mind that a developer can change the balance: Adobe, for example, optimized file opens for Photoshop to address the emulation slowdown in System 7.5. The result is that Photoshop 3.0 on an 8100/110 is faster at opening a file than on a 90MHz Pentium PC, even though the Power Mac's I/O is slower.

But while Apple continues to hold rough parity for the fastest computers, its pricing is decidedly steeper. According to Apple's estimates, a Power Mac 8100/110 costs about $7000 (including 17-inch monitor and keyboard). The Micron PowerStation—configured with a 2GB drive, double-speed CD-ROM drive, 2MB of VRAM, 16MB of RAM, 17-inch monitor, keyboard, mouse, sound card, and stereo speakers—costs about $4800. An equivalent Power Mac 8100/80 costs about $7000.

(For both the PowerStation and the 8100/80, we added the price of a second 1GB drive, since the largest internal drive packed with the two systems is 1GB. Because adding a drive costs more than having a larger drive to begin with, the Power Mac 8100/80 and 8100/110 have the same total price.)—GALEN GRUMAN

How the Top Power Mac and Pentium PC Compare



BEHIND OUR TESTS

Macworld Lab used one of the fastest PCs, a Micron P90PCI PowerStation, and the fastest Mac, the Power Mac 8100/110. We set them up with 1GB hard drives, 8-bit color depth, and 16MB of RAM. The PC used MS-DOS 6.22 and Windows for Workgroups 3.11; the Mac used System 7.5. The tasks selected represent activities typical of users of high-end computers.—**Macworld Lab testing supervised by Danny Lee**

Special SIMM

SMALLER AND CHEAPER

Microtech International (203/468-6223) has begun shipping 16MB and 32MB SIMMs designed just for the Power Macs (they don't work in other Macs). The SIMMs are shorter, which Microtech says should reduce the chance of overheating and make them easier to install in the cramped Power Mac 8100. Prices vary daily based on supplier prices, but Microtech says, for the near term the Power Mac–specific SIMMs should cost about 8 percent less than 680X0 SIMMs.—GALEN GRUMAN

SCOTT PETERSON

Microtech's SIMM designed just for the Power Mac.

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New Products

THE LATEST MACINTOSH RELEASES

by Cameron Crotty

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY *MACWORLD*. UNLESS OTHERWISE STATED, THE MINIMUM REQUIREMENTS FOR OPERATION ARE A MAC PLUS WITH 1MB OF RAM, RUNNING SYSTEM 6. A ◀ SIGNIFIES THAT A NATIVE POWER MAC VERSION OF THE PRODUCT IS AVAILABLE. ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY *MACWORLD*. ALL PRICES ARE SUGGESTED RETAIL. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

HARDWARE

APS 230 MO and APS 1.3 MO

MO doesn't stand for the stuff that wins football games and presidential elections; it's the storage method employed by these two removable-media magneto-optical SCSI drives. The 230MB APS 230 MO uses a 3.5-inch cartridge and features an average access time of 46ms and a sustained data-transfer rate of 1.4 MBps during reads. The APS 1.3 MO stores 1.3GB of data on a 5.25-inch cartridge and features an average access time of 66ms and a sustained data-transfer rate of 1.3 MBps during reads. Both APS drives ship with cables, and the 230MO includes a single data cartridge. 230 MO internal $799.95, external $899.95; 1.3 MO internal $2009.95, external $2109.95. APS Technologies, 816/483-1600, 800/235-2753; fax 816/483-3077.

APS 230 MO

Datasafe

This fax modem runs at 28.8 Kbps (V.Fast Class) and 14.4 Kbps and has security features built into the hardware. You can configure the Datasafe to require a password, or to call back an authorized number when it receives a call. The modem supports most standard communications, correction, and compression protocols, including V.42bis and V.32bis for modem communications, and V.17 and Group III for sending and receiving faxes. When the V.34 standard is finalized, an update will be made available from Logicode for $19. The Datasafe ships with Delrina's Fax Lite for Mac. $329. Logicode Technology, 805/388-9000, 800/735-6442; fax 805/388-8991.

Diamond Pro 17TX and 21TX

Too bad you have to waste these two grille-mask (DiamondTron) color monitors on work instead of watching *Blade Runner* in painfully high resolution. The 17-inch 17TX has a 0.25mm aperture pitch and can achieve resolutions up to 1280 by 1024 pixels at 75Hz. The 21-inch 21TX has a 0.30mm aperture pitch and can achieve resolutions up to 1600 by 1200 pixels at 72Hz. Both displays feature digital controls, are Energy Star–compliant, and meet the Swedish MPR II emissions guidelines. 17TX $1199; 21TX $2275. Mitsubishi Electronics, 714/220-2500, 800/843-2515; fax 714/229-3854.

Diamond Pro 17TX and 21TX

DynaDisq 240, 525, 1000

It's not as dramatic as putting an addition on your house, but adding more storage to your Macintosh can help get rid of that closed-in feeling. Fujitsu's new line of SCSI hard drives starts with the DynaDisq 240, with 240MB of storage space, a 14.5ms average access time, and a maximum sustained data-transfer rate of 4.7 MBps. The DynaDisq 525 has 525MB of storage space, a 12ms average access time, and a maximum sustained data-transfer rate of 4.7 MBps. The largest of the three hard drives, the DynaDisq 1000, has 1GB of storage space, a 9.5ms average access time, and a maximum sustained data-transfer rate of 4.7 MBps. 240 $310; 525 $295; 1000 $650. Fujitsu Computer Products, 408/432-6333, 800/626-4686; fax 408/894-1706.

HL-655M

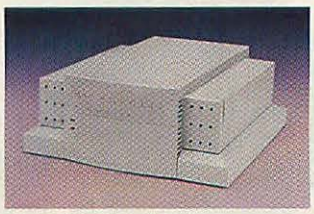
If you've ever cursed a crumpled and creased envelope as it exited your laser printer, you'll be interested to hear that this 300-dpi, 6-ppm laser printer feeds paper from a tray in the rear, creating a straight path for your documents. The HL-655M comes with 2MB of RAM, a serial interface, 21 TrueType fonts, and BookMaker's ClickBook software. $599. Brother International, 908/356-8880, 800/276-7746; no fax.

Mac Splitters

Share your vision with a nearly unlimited number of people, with this line of video-distribution amplifiers. Each amplifier has its own power supply and supports multiple monitors at distances up to 250 feet. The amplifiers can be used individually or cascaded to create large networks. Units are available with two, four, six, eight, and ten outputs. Prices range from $295 to $1095. Communications Specialties, 516/273-0404; fax 516/273-1638.

Micropolis 2GB and 4GB

Based on Micropolis's new 2.1GB Taurus Model 4221 and 4.3GB Capricorn Model 3243 mechanisms, these 3.5-inch SCSI-2 drives are available in either SCSI-2 Fast or SCSI-2 Fast and Wide configurations. Both drives have average access times of 13ms and maximum sustained data-transfer rates of approximately 7 MBps. 2GB internal $2320, external $2775; 4GB internal $3765, external $4220. Micropolis, 818/709-3300, 800/395-3748; fax 818/701-2809.



Micropolis 2GB and 4GB

MS 4.0 and MS 9.0

Sort of like the 4-ton box of detergent in the grocery store, these two SCSI-2 hard drives are definitely family-size. The MS 4.0 is a 4GB, 3.5-inch, half-height drive with an average access time of 13ms and a sustained data-transfer rate of 3.6 MBps during reads. The 9GB, 5.25-inch MS 9.0 also features an average access time of 13ms and a sustained data-transfer rate of 3.6 MBps during reads. MS 4.0 internal $2499.95, external $2599.95; MS 9.0 internal $3599.95, external $3799.95. APS Technologies, 816/483-1600, 800/235-2753; fax 816/483-3077.

Phaser 540

Phaser 540

Whether your favorite color is puce, taupe, or something in between, you can most likely print it out on this 600-dpi true-resolution color laser printer. The Phaser 540 can produce 4 color pages per minute or 14 monochrome pages per minute and is compatible with PostScript Level 2, HPGL, and PCL 5. The printer comes with 39 resident PostScript fonts and 20MB of RAM (expandable to 52MB). Ethernet ($595 with EtherTalk, NetWare, Microsoft LAN Manager), Token Ring ($895), and AppleTalk/serial cards ($245) are all available; at least one card is required for Mac compatibility, as the printer ships with only a parallel interface. $8995. Tektronix, 503/682-7377, 800/835-6100; no fax.

QA-1100

A 1.7-million-color LCD projection panel, the QA-1100 has an 8.4-inch-diagonal screen with a 640-by-480-pixel resolution. The panel accepts standard Macintosh video input, features on-screen setup menus, and includes a remote control with which users can enlarge or freeze images during a presentation. A backlight is also available. $4795; backlight (QA-BL1) $595. Sharp Electronics Corp., 201/529-8731; fax 201/529-9636.

ShowMan

When you have to take your show on the road, this product packs a CD-ROM drive with a video scan converter into a single flat box that fits under your PowerBook. The ShowMan accepts VGA video (available from 160, 165c, 180, 180c, 520, 520c, 540, and 540c PowerBooks) and sends out NTSC (or PAL) composite or S-Video signals. The

continues

product is available with either a 3x (450-KBps sustained-data-transfer rate) or a 4x (600-KBps sustained-data-transfer rate) CD-ROM drive. ShowMan 3x $999; ShowMan 4x $1199. P2 Systems, 206/525-2081; fax 206/525-2081.

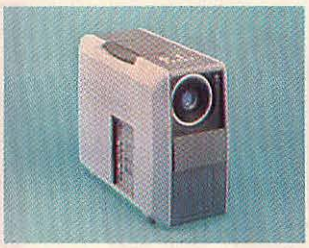
SmartView 3600
The composite video–in port on this color LCD projection panel means you can flip back and forth between a VCR running *Plan 9 from Outer Space* and a CD-ROM encyclopedia entry on director Ed Wood. The SmartView 3600 has a 640-by-480-pixel active matrix screen that can produce 262,000 colors simultaneously. The panel also has built-in speakers, uses on-screen menus for setup, and comes with a remote control. $4299. In Focus, 503/685-8888, 800/294-6400; fax 503/685-8887.

SmartView 3600

TVator-Remote
Convert your Macintosh video output to composite video, and control your presentations from the palm of your hand with this scan converter. The product accepts a VGA signal (produced by most Macs made after the LC and by some PowerBooks). With the included remote control, users can control image overscan and underscan, horizontal and vertical position, and picture brightness and sharpness. The TVator-Remote can also freeze a current image and double the size of the screen image to zoom in on a particular area. $499. Antec, 510/770-1200; fax 510/770-1288.

VisionMaster Pro 21
Dialing in this 21-inch multiresolution color monitor will be a snap for couch potatoes: you can adjust everything from the display parameters to the motorized tilt-and-swivel base with the included remote control. The VisionMaster Pro 21 features a 0.30mm aperture pitch and a maximum resolution of 1600 by 1280 pixels at 70Hz, and the monitor can sync to video signals up to a 160Hz vertical refresh rate. The VisionMaster is Energy Star–compliant and meets the Swedish MPR II guidelines. $2150. Idek, 215/957-6543, 800/394-4335; fax 215/957-6551.

XG-E650U
Give your presentation audience the big picture with this portable color projector. This product uses an active matrix, color LCD screen, provides 16 million colors at 640-by-480-pixel resolution, and produces a 40-inch-diagonal image at distances of 4 to 5 feet. Moving the projector back enlarges the image—up to 150 inches at 21 feet from the screen. The XG-E650U has inputs for composite video and S-Video, plus two-channel audio input that can be piped through the unit's internal amplifier and speaker. $7995. Sharp Electronics Corp., 201/529-8731; fax 201/529-9636.



XG-E650U

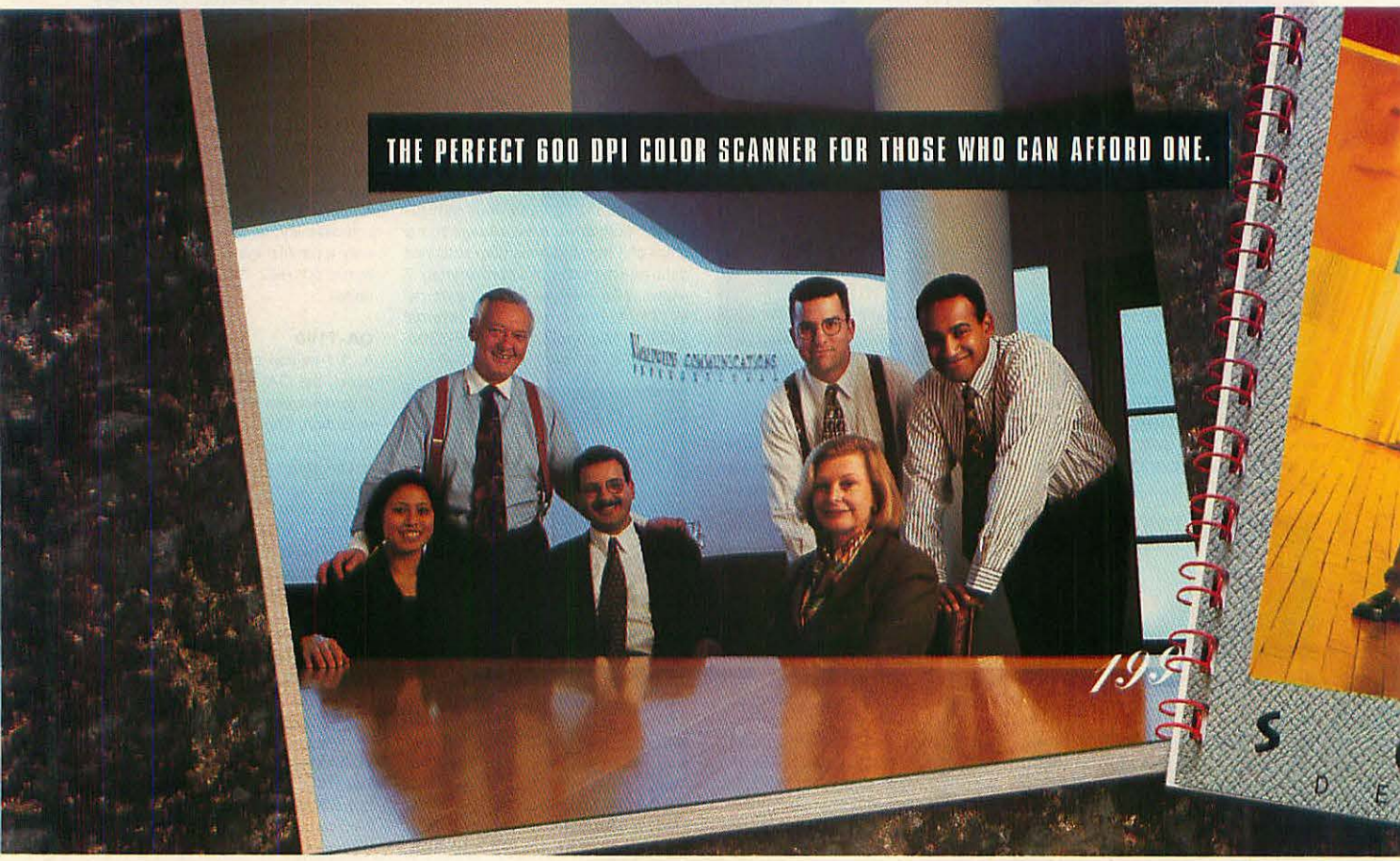
SOFTWARE

Bubblegum Crisis—The Screen Saver
Anime (Japanese-style animation) is coming to your desktop in the form of a screen saver. During idle times, Bubblegum Crisis—The Screen Saver randomly plays one of more than 100 short video clips from *Hurricane Live 2032* and *Hurricane Live 2033*, the two movies in the Bubblegum Crisis series. The package also includes a video jukebox that plays music videos from both movies. The screen-saver engine features password protection and can be activated by a user-defined hot key or cursor location. Note that the screen saver contains brief nudity and may not be suitable for children. 4MB min. memory; requires Mac II, System 7. $34.95. Software Sculptors, 212/679-1171; fax 212/679-2322.

Dinner
After making a million decisions at work, who wants to be hassled with deciding what to eat for dinner? Just select a menu plan from the software's 16-week storehouse, and Dinner retrieves each recipe, a complete shopping list, and a graphic display of each meal's nutritional content. You can add your own recipes to the database; once they're added, you can print recipes, include them in a menu plan, and analyze them for nutritional content. $49.95. Culinary Concepts, 303/938-9130; no fax.

Easy-CD Pro
You can cut your own discs with this CD-ROM recording software. Easy-CD Pro supports ISO 9660, Macintosh HFS, CD-DA, and Mixed-Mode file formats, and works with CD-R writers currently available from Kodak, Philips, Pinnacle Micro, JVX, Plasmon, Ricoh, and Yamaha. 8MB min. memory; requires Quadra 700. $1495. Incat Systems, 408/379-2400; fax 408/379-2409.

Equalizer
If you were up late last night wondering how many square centimeters there are in a hectare, you'll want to know about this unit-conversion software. Within Equalizer, you can create tables with up to nine conversion columns and an unlimited number of rows. The software contains information on more than 1500 units of the American, British, metric, and Standard International systems, along with assorted archaic and specialized measurements. Requires Macintosh



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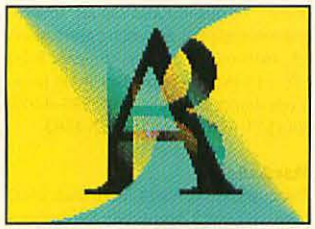
II. $49.95. Bare Hill Software, 716/554-5440; fax 716/554-4223.

Living Album
Organize photos, audio, and video into an album format with this multimedia software. A Living Album page can hold 36 photo entries, each represented by a thumbnail still, and users can tie video clips, sound clips, and text descriptions to each picture. A single high-density floppy holds up to 36 entries (without video), plus a copy of the Living Album Viewer program. 5MB min. memory to create albums; requires System 7.0. $129.95. Quick Media Labs, 408/749-9200, 800/957-0009; fax 408/257-9554.

Living Album

Michael's Gradient Effects
A set of transitions and visual effects that work with Adobe Premiere's Gradient Wipe plug-in, this package includes pattern-based effects, textured wipes and irises, and organic designs. Users also receive a quick-reference chart and a booklet of gradient tips and tricks. Requires Premiere 4.0. $39.95.


Michael's Gradient Effects

Michael Feerer & Associates, 206/647-0112; fax 206/647-0112.

Peanuts Family Organizer
Charlie Brown, Snoopy, and Linus will help keep your whole family on track. The Peanuts Family Organizer is equipped with a scheduler, to-do list, address book, and message center, and families can schedule activities either as a group or as individuals. Each family member has an individual schedule, address book, and in-box in the message center. The software notifies you when there's a schedule conflict, and you can set reminder alarms for important events. Requires Mac SE. $19.95 street price. Individual Software, 510/734-6767, 800/822-3522; fax 510/734-8337.

PreFab Player
AppleScript is great, just so long as the application you want to script supports something beyond the core suite of commands. PreFab Player can choose items from menus, click on buttons in dialog boxes, type text, and otherwise operate the Macintosh user interface through an AppleScript script. PreFab Player runs as a faceless background application. A playback-only utility is also available for $25. $95. PreFab Software, 617/628-9025; fax 617/628-9043.

Snapz
If the Mac's built-in screen-capture routine is leaving you in the lurch, this utility can ride to your rescue. Snapz captures nearly anything that happens on your screen, including start-up icons, pull-down menus, games, animations, video, and screen savers. Snapz can save a captured screen in one of 15 file formats. $15. Ambrosia Software, 716/427-2577; fax 716/475-9289.

zCalc
You'll have a better chance of remembering your variables if you use this RPN scientific calculator. zCalc provides 100 user-storage registers, and you can tag each register with a text label up to 30 characters long. The calculator has a range of scientific, statistical, and financial functions, and it can convert between units in 15 different categories, including mass and area. zCalc also does hexadecimal calculation and includes many common constants. $79.95. Pixel City, 415/367-0808; no fax.

CD-ROMS

Hometime Weekend Home Projects
Want to upgrade your cave without looking like an ape? This disc provides information on materials and tools and gives step-by-step instructions on how to do basic home improvements. Supplemented with QuickTime video footage from the "Hometime" television series, the title covers more than 60 projects in 12 subject areas, including ceramic tile, hand and power tools, cabinets and counters, paints and stains, wallpaper, and building a deck. 8MB min. memory; requires color Mac, 13-inch monitor, System 7.1, double-speed CD-ROM drive. $45 street price. IVI Publishing, 612/996-6000; fax 612/996-6001.

Kid Pix Studio

Kid Pix Studio
We've come a long way from the 64-color box of Crayola crayons with the built-in sharpener on the side. Kid Pix Studio is a paint program that lets kids add animation, sound, and QuickTime movie clips to their creations. In addition to the familiar Kid Pix features, Kid Pix Studio includes animated stamps and brushes, as well as digital puppets that kids animate by tapping keys on the key-

continues

Introducing the Sharp JX-330. No matter who you are, this is the 24-bit color scanner for all your graphic needs. This is the one with Sharp's patented one pass scanning, true 600 dpi, and the ability to scan reflective art and transparencies. This is the scanner that reproduces 16.7 million brilliant colors with precision and detail, so you can add images to publications, create dazzling comps, or convert printed words into editable text. This is the one that delivers near commercial output at an affordable price. This is the Sharp JX-330 and, whether you're a one-man studio or one big company, this is the perfect desktop solution. For more information call 1-800-BE-SHARP or FastFax 201-529-9113.

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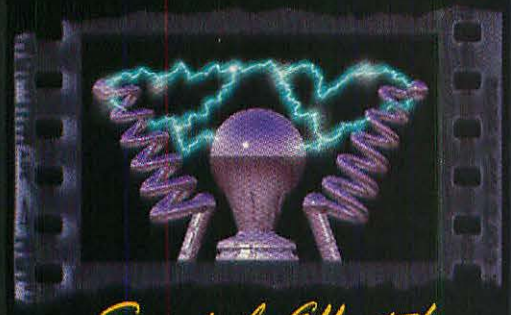
STRATA™ MEDIA Paint



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board. The disc includes clip art, sounds, and movie clips to get young artists started. 4MB min. memory; requires 8-bit color, 13-inch monitor. $45 street price. Brøderbund Software, 415/382-4400, 800/521-6263; fax 415/382-4582.

MacGallery
This collection contains more than 2500 color and black-and-white illustrations ranging from cartoon characters and holiday images to border designs and business graphics. All images are saved as 72-dpi PICT files. $159.95. Dream Maker Software, 303/762-1001, 800/876-5665; fax 303/762-0762.

MacGallery

Modus Internet
A compilation of freeware, shareware, and free commercial software, this disc promises to have everything you need to get connected to the Internet, including trial offers for several online services. For those interested in going it on their own, the disc has a trial version of Intercon's TCP/Connect II, and several utilities, including Eudora, MacTCP, InterSLIP, rnMac, TurboGopher, and Fetch. $9.95. Modus, 505/820-6500, 800/820-6504; no fax.

ObjectGear
This line of clip art comes with prebuilt shadows in separate TIFF files, so you can adjust the shadows' darkness and placement. Items depicted on the ObjectGear discs are photographed individually against a white background and saved as EPS files at a resolution of 266 pixels per inch. Each file contains a clipping path for its object, so no cropping is necessary. $99. Image Club Graphics, 403/262-8008, 800/387-9193; fax 403/261-7013.

Small Blue Planet: The Cities Below—The Aerial Atlas of America
The United States of America is a big country, but with this program you can get a perspective on the land of the free and the home of Michael Jordan. The Cities Below is a gray-scale relief map of the United States, dotted with infrared satellite images of major cities. You can zoom in on the relief map or any of the images. The disc includes an almanac with complete city histories and information about current culture, environment, and population. 4MB min. memory; requires color Mac. $49.95. Now What Software, 415/885-1689, 800/322-1954; fax 415/885-4092.

Small Blue Planet: The Cities Below—The Aerial Atlas of America

Star Trek: 25th Anniversary Enhanced CD-ROM
The digitized voices of Kirk, Spock, and McCoy bring this adventure game to life as players guide the crew of the *Enterprise* through seven episodes. The game combines role-playing with arcade-style action—players must solve puzzles and mysteries as well as defeat enemy warships to advance to the next level. 2MB min. memory; requires color Mac. $49.95. MacPlay, 714/553-3522, 800/736-5738; fax 714/252-2820.

Taxi
Living on the road can be a draining experience, and there's nothing worse than arriving in an unfamiliar city and wondering where you're going to eat dinner. Taxi contains detailed maps of several major cities, with a database of addresses so you can find your way around. The package also has the Zagat Survey database of hotels and restaurants, with ratings and reviews based on food, decor, service, and price. The CD-ROM version covers New York; Chicago; Washington, D.C.; Los Angeles; and San Francisco; it also includes data for suburban areas. A central-city–only version is available on floppy disk. 4MB min. memory; requires System 7.0. CD-ROM $59.95; floppy $49.95. News Electronic Data, 908/735-2555, 800/439-8294; fax 908/735-8113.

ACCESSORIES

GlidePoint
You can guide your Macintosh with a light touch if you have one of these ADB pads. Measuring 2.5 by 1.9 inches, the GlidePoint creates a tiny electric field that distorts when you place your finger on the pad. The hardware resolution is 400 dpi, and the device has three buttons, one of which is programmable with the included driver software. With that same software, you can also adjust the acceleration curve and the cursor size. $99.95. Alps Electric, 408/432-6000, 800/825-2577; fax 408/432-8337.

GlidePoint

Port Briefcases
Most notebook cases use foam padding to protect their contents. Port's cases have a neoprene sling in the center that cradles your PowerBook. The cases come in several styles, including a simple portfolio, a backpack, and various over-the-shoulder bags. Different fabrics are

also available, from canvas to ballistic nylon to leather. Prices range from $84 to $329. Port Computer Briefcases, 203/852-1102, 800/242-3133; fax 203/866-0221.

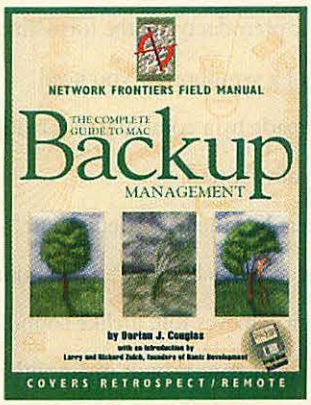
SlimPack Lite

SlimPack Lite
This external lead-acid battery powers 100-series PowerBooks for up to 7 hours, depending on the model (on a 180c, a single charge lasts about 3 hours). The 8½-by-4½-by-½-inch SlimPack Lite weighs 2 pounds and, with the included fasteners, attaches to either the back screen or the bottom of the PowerBook. The SlimPack Lite recharges in 4 hours using the PowerBook AC adapter. $99. BTI, 213/728-7874, 800/982-8284; fax 213/ 728- 7996.

BOOKS

The Business Week Guide to Multimedia Presentations
Written by Robert Lindstrom, this book discusses how businesspeople without a strong technical background can quickly create multimedia business presentations. The author includes tips on how to design presentations, how to use sound to engage audiences, and when to use interactive presentations. The book comes with a CD-ROM containing trial versions of software from Adobe, Fractal Design, Lotus, and Macromedia. 448 pages. $39.95. Osborne/McGraw-Hill, 510/549-6600, 800/227-0900; fax 510/549-6603.

The Complete Guide to Mac Backup Management
Covering subjects from explanations of networks to a complete discussion of Dantz Development's Retrospect backup software, this book guides readers through backing up their data. The book includes a copy of Santorini's Server Sleuth—software that returns information on file ownership and access privileges, label and size info, and timetables for how long it takes to back up each file and server. Written by Dorian Cougias. 424 pages. $49.95. APS Technologies, 816/483-1600, 800/235-2753; fax 816/483-3077.



The Complete Guide to Mac Backup Management

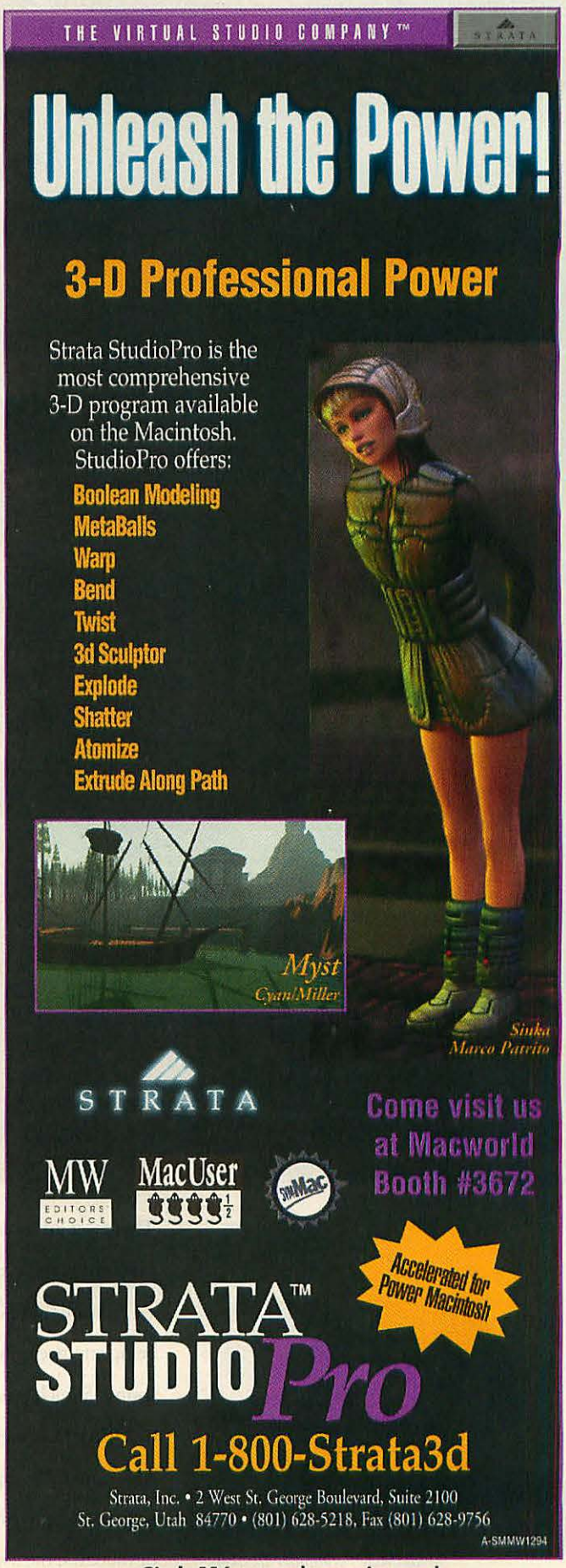
Microsoft Word 6 for the Macintosh Made Easy
Where would a major word processor be without a book to lead users through its intricacies? This book contains hands-on lessons to help readers grasp the fundamentals of working with Word, exercises to help master intermediate and advanced skills, and real-world examples of what users can accomplish with their knowledge. Written by Paul Hoffman. 438 pages. $19.95. Osborne/McGraw-Hill, 510/549-6600, 800/227-0900; fax 510/549-6603.

Net Games
What (or who) is playing on the Internet? This guide covers games both on and off the Net and the groups that discuss them. The book's editorial team tells readers about multiplayer Net games like Bolo and Air Warrior; card- and board-game servers for games such as chess and go; play-by-mail strategy games; and the participatory narrative adventures known as MUDs, MOOs, and MUSHs. Readers will also discover where to go for tips on the editorial team's favorite home and arcade games. Written by Michael Wolff & Company. 288 pages. $19. Random House Electronic Publishing, 410/848-1900, 800/733-3000; fax 410/857-9460.

Networking Illustrated
If you think *local area network* means the people in town you play poker with, you might want to check out this book by K&M Solutions. It gives a perspective of networks through detailed illustrations, each accompanied by explanations and technical tips. The book covers protocols, resource sharing, physical topologies, and components. 213 pages. $24.99. Que, 317/581-3500, 800/428-5331; fax 317/581-3550.

PGP: Pretty Good Privacy
There's a privacy battle brewing on the horizon, and this book can help you discover and wield one of the most popular and effective weapons. Author Simson Garfinkel describes how to find and use Phil Zimmerman's public-key encryption software, Pretty Good Privacy (PGP), on nearly any computer platform. Garfinkel also includes general information on cryptography, U.S. government export restrictions, battles against public-key patents, and the ongoing debate over privacy and free speech. 400 pages. $24.95. O'Reilly & Associates, 707/829-0515, 800/998-9938; fax 707/829-0104. m

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.



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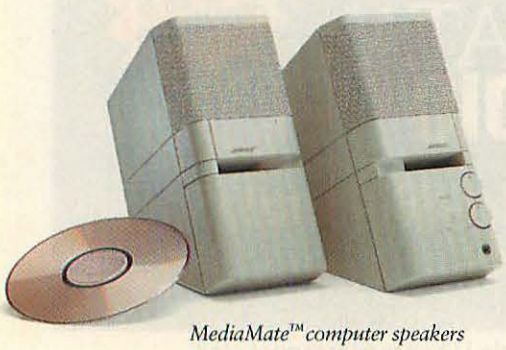
How to bring out the CD in a CD-ROM.



MediaMate™ computer speakers

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ing every whisper and bang in your CD-ROMs. Even at low volume you'll hear robust lows as well as sparkling highs. They were also designed to work with all multimedia hardware. Dual input allows you to hear two sources simultaneously, such as your computer plus a compact disc player or musical instrument. And, of course, MediaMate speakers are magnetically shielded so you can set them next to your monitor or magnetic media.

A multimedia system can be a fantastic adventure for entertainment and games, as well as a valuable tool for education, business presentations or professional MIDI applications. Multimedia is also a meaningful investment – so don't shortchange yourself on your speakers.

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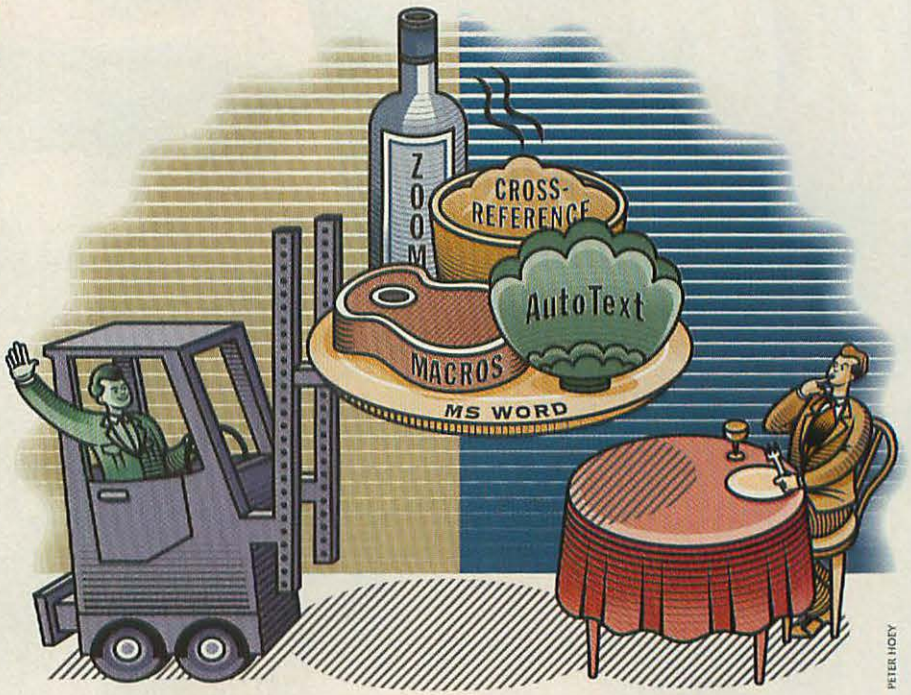
Reviews

Microsoft Word 6.0

Word Processor

PROS: Dazzling array of new features; many interface improvements; works identically to Windows version. **CONS:** Slow; can't use ruler to adjust tabs and margins with their dialog boxes open; dual-platform manual makes finding Mac-specific information difficult. **COMPANY:** Microsoft Corporation (206/882-8080).
COMPANY'S ESTIMATED PRICE: $329.

MW ★★★



PETER HOEY

THE LATEST VERSION OF THE MACintosh world's most popular word processor has been out for several months now. It's been lynched online and at user groups, it's been tossed in the Trash and returned to dealers, and it's lost market share to Novell's WordPerfect, which had for years been a relatively minor player among high-end Mac word processors.

What happened? Three things: First, Microsoft made Word's interface identical to that of Word 6.0 for Windows, and the differences annoyed many 5.1 loyalists. Second, Microsoft included such a huge array of add-on utilities, document templates, and gimmicky autoformatting Wizards that a full installation of Word 6 swallows 25MB of hard disk space. Third and most significant, Microsoft shipped a program that is often dramatically slower than its predecessor—so much so that it doesn't run acceptably on 68030-based Macs, or even on slower 68040 Macs such as the Quadra 610.

Some of Word's reported performance problems are genuine, but much of the criticism leveled against the program has been a bit overblown. There are flashes of brilliance in Word 6, and the new cross-platform compatibility is a boon to businesses that mix Macs and Windows machines. But before you upgrade, you need to weigh Word's innovations against its greed for hard disk space and horsepower.

A Fancy Face-lift

Word 6 sports an entirely new look and feel, featuring a multitude of tool bars and attractive 3-D dialog boxes, many of which display previews as you select formatting options (see "The Latest Word"). I'm not a big tool-bar fan—when I'm writing, my hands spend far more time on the keyboard than on the mouse. Fortunately, you can hide all the tool bars or show only those that you use. You can create your own tool bars, which you can also turn into floating palettes.

Word 6 joins WordPerfect and Claris's MacWrite Pro in providing zoom features that let you magnify or shrink a document while still being able to edit it. You can also edit a document and adjust ruler settings in Word 6's greatly enhanced Print Preview window—something WordPerfect doesn't allow.

Word 6's ruler is a good example of the good news/bad news changes that Microsoft has made. Adjusting column widths is much easier than in Word 5.1. Also, a new vertical ruler appears when you're in page-layout view and lets you adjust top and bottom margins. And best of all, if you press the option key while dragging any ruler or tab marker, Word displays precise numeric measurements in the ruler itself. That's useful because the bad news is that Word 6, unlike its predecessor, doesn't let you adjust the ruler's tab or margin markers while the Paragraph or Tabs dialog box is open.

Word has always been a shortcut-lover's paradise, and Word 6 continues the tradition. New, context-sensitive

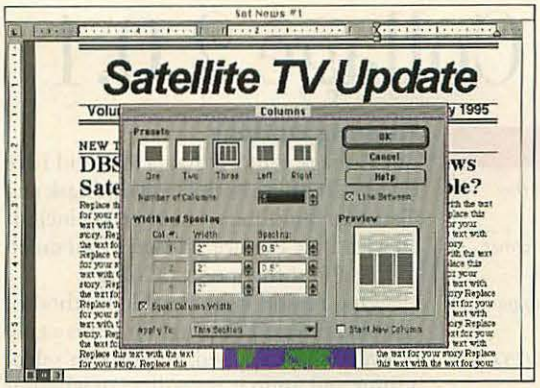
shortcut menus appear when you click on something while pressing the control key. You can also rearrange the menus and redefine Word's keyboard shortcuts. And there's a new and powerful macro language, WordBasic, that lets you automate repetitive tasks and even create customized dialog boxes.

Features, Features, Features

Word 6 provides dozens of typing, editing, and formatting enhancements. The AutoCorrect feature fixes common typos as you type; it's also a great way to store and recall often-used text, as is the AutoText feature, which replaces Word 5.1's clumsy Glossary command. The Smart Cut and Paste feature makes sure you don't have too many or too few word spaces when you move text around. You can drag and drop text or graphics from one document window to another. You can format a word without first selecting it—just put the blinking insertion point anywhere within it. You can set up style sheets that work on a character level instead of the paragraph-level styles Word 5 was limited to. You can undo and redo up to 100 actions. You can create electronic bookmarks that let you navigate large documents easily.

For heavy-duty document processing, Word 6 sports automatic numbering, captioning, and cross-referencing features that streamline the process of adding figures and referring to them in the text. Word's table-of-contents and index features offer more formatting options than do other word processors. As a tool for producing books and manuals, Word 6 compares favorably with technical publishing programs such as Frame Technology's FrameMaker.

For workgroup projects, Word provides an amazing new revision-tracking feature that lets editors modify a document while retaining its original contents. You can then step through each revision and decide whether to incorporate it or restore the original text. The annotations feature, which lets you attach typed or spoken comments to a document, is also easier to use and more powerful than its Word 5 counterpart.



The Latest Word Word 6 provides customizable tool bars and flashy dialog boxes that provide preview options. Also visible here are the improved rulers; note the vertical ruler, which appears in page-layout view.

Word 6's table editor is light-years ahead of Word 5's. You can adjust column widths by dragging column boundaries, you can add borders and shading using the new Borders tool bar, and you can even create spreadsheetlike formulas that calculate the values in a table. There's also a built-in forms feature that lets you set up FileMaker Pro–like data-entry forms, complete with pop-up menus and buttons.

Word 6's macro and customizing features go well beyond any competing program's. You can work with macros on a simple level—recording tasks as you perform them and then playing them back later—or you can dive into Word's macro language, WordBasic, to create macros that exchange data with other programs, display customized dialog boxes and then perform actions depending on your responses, and execute AppleScript scripts. In the customizing vein, you can add and remove not only menu commands, but entire menus. Macros and custom menus are stored in template documents. By combining macros with Word's menu malleability, a corporate programmer or consultant can create a customized word processing application containing only those commands needed to perform a specific task, such as completing insurance claim forms or customizing a boilerplate contract.

Performance Problems

What price do you pay for all this power? Time. Word 6 just feels less responsive than WordPerfect 3.1, even though my tests show Word 6 to be faster at scrolling, at searching and replacing, and at switching from a one-column format to a three-column format.

Word 6 is slowest at launching, taking nearly 30 seconds to start up on my Quadra 840AV. Word 5.1 and WordPerfect 3.1, by comparison, launch in about 10 seconds. On my PowerBook 170, Word 6 takes a nearly a minute to launch. The program's View menu is unusually sluggish, often taking a second or two to appear after you click on its title.

Word 6's Word Count command *appears* to be snail-like, but in a way, it's faster than Word 5.1's. Unlike Word 5.1 and WordPerfect 3.1, Word 6 displays an approximate word count instantly, and then proceeds to count every word to arrive at an exact count. It's this second phase that takes forever.

The Last Word

But what constitutes good performance: how quickly a program launches or how quickly it lets you finish your work? If you can benefit from Word's laundry list of new automation features—cross-referencing, AutoText, automatic numbering and renumbering, macros—you stand a good chance of saving more time over the course of a day than you'll lose waiting for Word to start up. If your needs are more basic—if you just want to use a word processor to, say, *write*—forget Word 6 and WordPerfect and get ClarisWorks or SoftKey International's WriteNow.

But if you can put Word 6's features to work and if you have a Quadra 650 or faster Mac, take the plunge, but use the Custom Install option to pare down the program's disk-space requirements. If you have a slower 68040 Mac, think twice. And if you have a 68030 Mac, think WordPerfect.—JIM HEID

FIVE WAYS TO SPEED UP WORD 6

- Hide all tool bars, the status bar, and the ruler. This dramatically decreases the time required to start Word.
- Don't let a floating tool bar overlap the document window. This slows scrolling significantly.
- In page-view mode, hide the rulers if you aren't using them. This speeds scrolling.
- Give Word more memory. If you have 8MB or more of memory, use the Finder's Get Info command to boost Word's allocation to at least 3000K.
- Fine-tune Word's advanced settings. You can make a big difference in Word 6's performance by tweaking the way it uses memory. For details, you'll need a copy of a Microsoft technical note called *Mac Word 6.0 FastTip: Setup & Performance Optimization.* I've posted a copy in the Macworld Online forums on America Online and eWorld.

Specular Collage 2.0.1

Image Editor

PROS: Can undo any filter, regardless of the order in which it was applied; supports CMYK images; renders to Photoshop 3.0 format with layers intact. **CONS:** Low-resolution proxies; can't draw or edit masks inside program; doesn't recognize LZW compression.
COMPANY: Specular International (413/253-3100). **LIST PRICE:** $399.

MW ★★★

SPECULAR COLLAGE WAS THE FIRST program on the Macintosh to take advantage of proxy-based image editing. Unlike Adobe Photoshop, which applies all edits directly to the pixels in the original image—thereby slowing down the editing process and potentially degrading the image quality over time—Collage displays the effects of your edits on screen using a low-resolution proxy. As a result, most edits complete in a matter of seconds, regardless of the image size, and the original image data remains unscathed. Once you finish a composition, you can render it to disk at any resolution. Only then does Collage apply your edits to each and every pixel in the original high-resolution image. However, it does this in RAM and outputs to a new image file, thus protecting the original image file on disk.

But as anyone who has used Collage already understands, this system leaves something to be desired. Unlike HSC Software's Live Picture, which dynamically redraws the screen proxy as you zoom and scroll, Collage's proxies are fixed at 72 pixels per inch. This means that magnifying your image just displays larger pixels. Where Live Picture's more intelligent sytem is capable of representing your edits as accurately as Photoshop, Collage's representation of your edits amounts to a rough estimate.

If Live Picture offers a better proxy system, why buy Collage? Obviously price is one incentive: Collage lists for one-tenth the price of Live Picture and can be bought on the street for even less. Collage also requires less-sophisticated machinery. It subsists comfortably on 8MB of RAM and a 250MB hard drive; even Photoshop 3.0 can't manage such close quarters. This means freelance artists and other folks on a budget can take advantage of the speed and flexibility of proxy-based editing without the prohibitively high cost.

Filtering Options

But Collage is more than a low-end Live Picture. It offers both Unsharp Mask and Gaussian Blur filters—neither are included with Live Picture. In fact, I find much to like about the modest Collage.

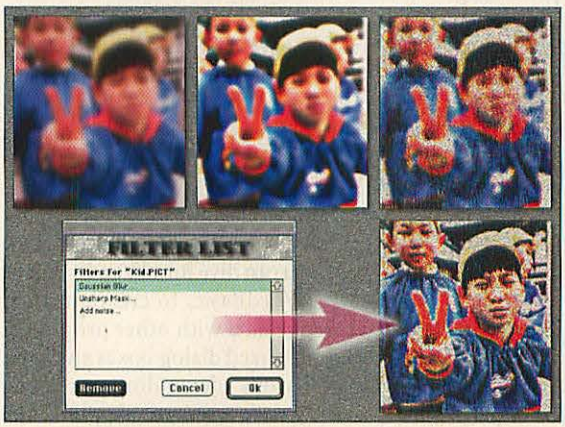
One reason is its flexible method of undoing filters. The program keeps a tally of every filter applied, so you can select a filter and undo it regardless of whether it was the first filter applied, the last, or somewhere in between (see "Removing Filters"). But be prepared to wait. Anytime you undo a filter, Collage has to reload the image from disk, generate a new proxy, and reapply each of the filters you didn't undo. Therefore, undoing a filter almost always takes more time than applying one.

Working with Photoshop

Though Collage 2.0.1 isn't a Photoshop plug-in, Specular has put some real thought into making sure the two programs are compatible. Collage now supports CMYK images, even permitting you to generate a CMYK color display table from inside Photoshop to maintain consistent CMYK screen display between the two programs. (Collage's method for creating a CMYK table could be more straightforward, but you won't have to do it very often.) You can even apply filters to individual color plates in a CMYK image, something no other image editor except Photoshop allows. The two things you can't do are mix RGB and CMYK images inside a single document, and convert an RGB document to the CMYK color space; after you specify the color space for a new composition, the space remains set in stone.

Previous versions of Collage rendered final images to a flat image file. But version 2.0.1 can render images to the Photoshop 3.0 format with their layers fully intact. This lets you set up a composition in the speedier Collage and then fine-tune the layers using functions available only in Photoshop. Collage 2.0.1 also provides better support for Photoshop masks. If a Photoshop image saved in TIFF or Photoshop format contains more than one mask channel, you can specify exactly which mask you want to use while in Collage.

Many of the features that I was dissatisfied with in Collage 1.0 have been addressed in the new version: You can now access a hand tool by pressing the spacebar, you can see the exact outline of the masked image when dragging it, you can change the page size of an existing document, and you can preview images from the Open dialog box. But some problems remain. For example, you can't import TIFF images compressed with LZW, you can't run filters in the background, you can't undo the Import command, and you can't open multiple images (which would be useful for dragging and dropping proxies between files). Worst of all, Collage provides no means for generating your own masks, as do both Photoshop and Live Picture. And if you decide to edit a mask in Photoshop, you'll still have to reimport the image and redo all the edits, something I complained about in my last review.



Removing Filters Collage 2.0.1 lets you undo any filter applied to an image, no matter when it was applied or in what order. Along the top row from left to right, I've applied the Gaussian Blur, Unsharp Mask, and Add Noise filters. In the bottom row, I undo Gaussian Blur, leaving only Unsharp Mask and Add Noise intact.

The Last Word

Collage 2.0.1 is a more practical compositing solution than its predecessor, supplying a smoother interface and better support for Photoshop 3.0. Collage is even showing signs of accommodating professional users—for instance, it now supports images as large as 16,000 by 16,000 pixels (nearly 20 square feet at 300 dots per inch).

But with its low-resolution previews and lack of internal mask-editing functions, Collage is likely to continue disappointing folks who expect to use it as a last step in the image-editing process. As long as you're willing to return to Photoshop to confirm your edits and make final changes, however, Collage is a serviceable tool.—DEKE McCLELLAND

Three Color Monitors

15-inch Color Monitors

Apple Multiple Scan 15 Display

PROS: Good built-in stereo speakers; inexpensive. **CONS:** Mediocre antiglare coating; 68030 Macs require cable adapter; one-year warranty. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** $509.

MW ★★★★

Multiscan 15sf

PROS: Adjustable image tilt; good antiglare coating; three-year warranty; inexpensive. **CONS:** Requires $18.95 MacView cable adapter. **COMPANY:** Sony Computer Peripheral Products (408/432-1090). **LIST PRICE:** $569.95.

MW ★★★★

MultiSync 3V Monitor

PROS: Three-year warranty; inexpensive; slightly superior image. **CONS:** Requires free, but not included, Mac cable adapter. **COMPANY:** NEC Technologies (708/860-9500). **COMPANY'S ESTIMATED PRICE:** $495.

MW ★★★★

NO LONGER MUST YOU SPEND OVER $800 for a monitor with good resolution and excellent image quality. Each of the monitors I evaluated costs about $500 and displays 832-by-624-pixel images at 74 dpi with quality good enough for all but a few Mac professionals.

I tested each of these monitors on a Quadra 700 with a 24-bit RasterOps video card using standard graphics, business, and video applications. I also tested the monitors using the internal video of the Quadra 700 and a Centris 650.

Each monitor displayed sharp, bright, and accurate images at Apple's standard 640-by-480-pixel and 832-by-624-pixel resolutions with a 75Hz refresh rate. The Sony and Apple monitors also support 1024-by-768-pixel images, but text was hard to read at that setting.

All three monitors run on both Macs and DOS-based computers, and all allow you to set brightness, contrast, and screen centering and sizing. Sony and NEC offer pincushioning control, and Sony also lets you adjust raster rotation (image tilt) and color temperature.

The monitor enclosures are all about 15 inches wide, 15 inches high, and 16 inches deep. They hog less desk space than 17- and 19-inch monitors.

According to Apple, NEC, and Sony, their monitors meet MPR 1990:8 (formerly MPR-II) guidelines and are Energy Star–compliant.

Apple Multiple Scan 15 Display

Apple's tridot tube provides a sharp and accurate image, but it reflects more glare than do NEC's or Sony's tubes. Apple's screen was also less flat (more rounded) than the other two, but still acceptable. The screen's edges became distorted when I increased the active area up to the bezel. Reducing the screen size a few millimeters restored everything to square.

The built-in stereo speakers reproduce sound better than the single speaker in the Quadra 700, a moderate benefit for CD-ROM fans. The Multiple Scan 15 doesn't have the ADB extension port included in Apple's larger color monitors, but it does include ColorSync.

MultiSync 3V Monitor

Despite a slightly pink cast on the left side of the screen, NEC's tridot 3V had the brightest display and the best image quality of the three monitors by a slight margin. But it took me a few days to discover that quality, because the cable adapter in NEC's Macintosh Configuration Kit supports only a 640-by-480-pixel image. Owners need to contact NEC to request a free adapter that runs the monitor at 832 by 624 pixels.

I prefer digital controls to the 3V's dials, but my personal taste didn't keep me from adequately adjusting the 3V's image using the monitor's dials.

Multiscan 15sf

Sony's Multiscan 15sf, built around a Trinitron tube, had poor convergence on the left edge of the screen—something Macworld Lab has seen in a number of Trinitron monitors—but this was its only flaw. The rest of the screen was sharp. The antiglare coating eliminated reflections and only slightly dulled the monitor's brightness.

Sony's monitor has the flattest tube of the three. At first, I found the image display shockingly flat, but after using the 15sf for a while, I actually preferred its minimal curvature. The 15sf's image was almost as bright as the 3V's.

The Last Word

If you need prepress color accuracy, or if you need to view and read the text of two-page layouts, you should consider the more expensive 21-inch monitors *Macworld* evaluated in "Big Screen Close-up" (November 1994). But for general business and graphics use, these monitors deliver fine quality at a moderate price.

The narrow difference in price isn't important. I prefer NEC's and Sony's images and antiglare coating, and I prefer Sony's digital controls to NEC's dials. At the moment, I plan to buy the Sony 15sf, but when I get to the store I will select the monitor that generates the best image.

Sure, I'd like to have a $1000 17-inch monitor in my home office, but I'd rather have a 15-inch monitor, more desk space, and $500 to spare.—JIM FEELEY

SHOPPING ADVICE

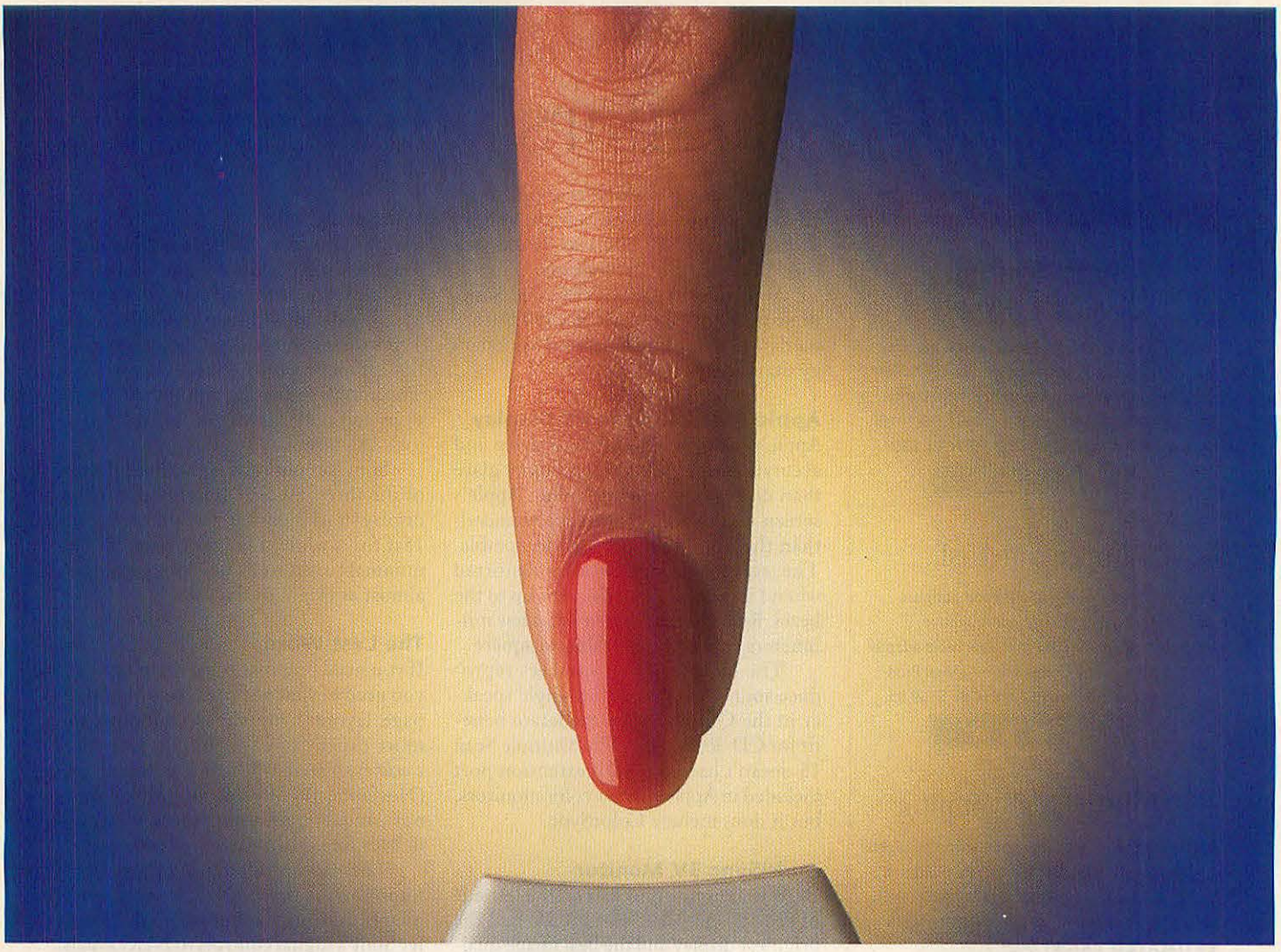
When shopping for a monitor, remember that individual monitors of the exact same model may have different geometric, focus, and color accuracy. You should evaluate more than one model. But that isn't always easy. I asked to look at monitors that were in stock but not on display in five different stores. Each store told me that it would not open unopened stock since it cannot be returned. While all of the stores said that I could return a defective monitor, they also said focus and image-quality issues fall under the user-satisfaction category and would not warrant an exchange.

View the monitor you plan to purchase. I'd rather buy a demo model with an image I like than a monitor I can't examine until I buy.

Be sure to let your new monitor warm up for at least 20 minutes. Then spend some time working with the applications you use every day. Check the focus in the corners by dragging a text document into the corners. Make sure that the lines look straight and that the colors are lifelike. Personally, I'd trade color and geometry accuracy for sharp text; a designer may prefer the opposite.

If you buy via mail order, be sure you get a money-back guarantee and ask how much it costs to ship the monitor back to the company.

Anderson & Lembke, Inc.



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MacWorld

Clue 1: AGFA

Photo Engine

Photoshop Acceleration Hardware

PROS: Accelerates 25 Photoshop operations; dramatically improves performance on a Power Mac; adds no new commands to Photoshop's menus. **CONS:** Does not accelerate JPEG compression. **COMPANY:** Radius (408/541-6100). **LIST PRICE:** $1099.

MW ★★★★

RADIUS'S PHOTO ENGINE NuBus board is the first DSP (digital signal processor) hardware to accelerate the performance of Adobe Photoshop 3.0 on both 680X0 and Power Mac computers. Although the Power Mac spells the end of boards equipped with only two DSP chips—in fact, such boards actually slow down many Photoshop operations on a Power Mac—the Photo Engine's suite of four 66MHz 32-bit DSP chips offers sufficient processing power to speed up some Photoshop functions on even the most sophisticated Mac systems.

The Photo Engine accelerates 25 Photoshop operations, including sharpening, blurring, resampling, and rotating. The board also speeds up infrequently used filters such as Emboss, High Pass, and Custom. If you work in CMYK mode, the Photo Engine speeds up conversion and display operations (much as Radius's Thunder II GX series of graphics card do). However, CMYK acceleration occurs only on 680X0 Macs and when Photoshop is set to the more accurate Smoother mode.

Factoring in RAM and Image Size

Like any DSP board, the Photo Engine relies on an uninterrupted data stream for its acceleration. This means that you achieve the most dramatic speed enhancements when an image fits entirely in RAM. With insufficient RAM, Photoshop has to swap chunks of the image out to disk; the DSP board can accelerate only those operations that occur between disk swaps. To keep disk swapping to an absolute minimum, Photoshop needs an amount of RAM equal to three times the size of the image plus an extra 8MB or so for the program code itself.

I compared the speeds of three operations—Unsharp Mask, Gaussian Blur, and Resampling—on a series of differently sized images when Photoshop was assigned 16MB and 64MB of RAM. The largest image, 15MB, did not fit in RAM when Photoshop was assigned only 16MB of RAM, but it had room to spare when Photoshop was assigned 64MB. Therefore, the speed enhancements were greater at the higher RAM setting.

When RAM is limited, the Photo Engine offers better speed increases as image size decreases, since a smaller image is more likely to fit in RAM. When plenty of RAM is available, the speed increases go down as the image size decreases. When Photoshop was assigned 64MB of RAM, the Photo Engine accelerated Unsharp Mask applied to the 4.75MB image by 3.00-fold. That's an improvement, but it's less savings than the 3.62-fold increase for the 15MB image.

The board's inherent strengths also account for the relative lack of speedup in the Resampling tests. Unlike filters that depend on adjustable radius values, resampling relies on a fixed, relatively small radius, thus stressing the importance of data transfers, which run at fixed speeds. As a result, the Photo Engine responds to increased RAM more than it does to image size. The same is true for rotating, feathering, single-shot sharpening and blurring, and even the Custom filter.

For 680X0 Macs, the Photo Engine's speed savings are more dramatic than those shown in my tests. Given sufficient RAM, the board may accelerate Unsharp Mask and Gaussian Blur by as much as tenfold. This makes the Photo Engine a good buy for anyone who plans to upgrade to a Power Mac and wants to transfer the DSP board to the new platform.

DSP and Static RAM

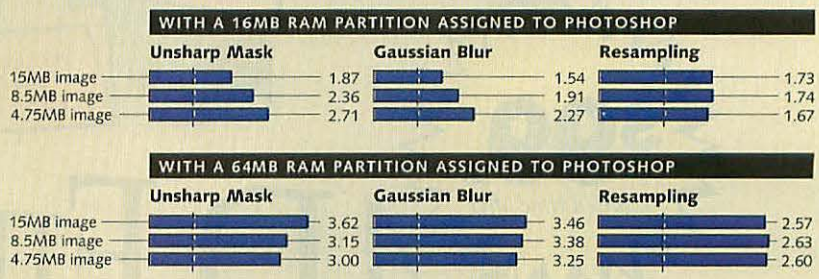
The Photo Engine derives its speed gains not only from the DSP chips, but also from 128K of look-ahead static RAM included on the board. The RAM allows the Photo Engine to simultaneously load and process data, thus maximizing the potential of the DSP chips so they don't rely on data-transfer rate. At the present time, no other DSP board comes with static RAM—yet another reason the Photo Engine can accelerate operations on the Power Mac that other boards can't.

Like most DSP manufacturers, Radius has rewritten some Photoshop code to make it more efficient. Even so, the code remains functionally identical to Photoshop's, earning the Photo Engine the Adobe Charged seal of approval. As with all Adobe Charged products, you choose the same commands you've been using all along. An option lets you display a green dot in the menu bar whenever the DSP chips are engaged.

My one minor complaint with the Photo Engine board is that it doesn't accelerate opening and saving operations. While it does speed up generation of preview icons, it doesn't boost JPEG compression or decompression speeds, a standard function of the old 16-bit DSP boards. Nor does the Photo Engine accelerate QuickTime JPEG compression applied to PICT files, or LZW compression applied to TIFF files.

Photo Engine's Speed Boosts

Times as fast as Photoshop without the Photo Engine. Longer bars are better. Dashed line indicates the speed of Photoshop without the Photo Engine.



All tests conducted on a Power Mac 7100/66AV. Settings for each test were Unsharp Mask at 200 percent and 10.0 radius; Gaussian Blur at 3.0 radius; Resampling to 75 percent.

The Last Word

While the Photo Engine is currently the best DSP hardware around, you should consider buying it only after the rest of your system is up to speed. The best way to accelerate Photoshop is with lots of RAM and a speedy hard drive. If you invest in a new machine, a Power Mac offers perhaps the most significant degree of acceleration. These solutions offer the advantage of accelerating all of your software, not just Photoshop. Once you have this equipment in place, you can achieve additional speedups by purchasing the Photo Engine board.—DEKE McCLELLAND

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Clue 1: 4D First

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Circle 17 on reader service card

StreetSmart 1.0

Financial-Investment Software

PROS: Ease of use; thorough, well-written documentation; excellent technical support; real-time quotes; inexpensive. **CONS:** Unreliable with network modems; excludes non-Schwab customers; users must enter some data manually; poor display of research data. **COMPANY:** Charles Schwab & Company (800/334-4455). **LIST PRICE:** $59.

MW ★★★

STREETSMART WON'T ADVISE YOU on how to make a killing in the market—the program doesn't provide financial counsel—but it does give investors the means to monitor Wall Street and actively manage their portfolios. Currently the only program of its kind for the Mac, StreetSmart lets you retrieve real-time quotes, download news, submit trades, create reports, and check your account balances. (Another discount brokerage, Fidelity Investments, plans to ship a Mac version of its On-Line Express before mid-1995.) Note that you can't fully benefit from StreetSmart unless you have an account with Schwab or plan to open one.

StreetSmart is easy to install and use. Connecting to Schwab's host computer is a breeze—just key in your one or two passwords and let the modem dial. Unlike some services, StreetSmart gets you online in a flash. You may not be able to connect, however, using a network modem: StreetSmart is designed for use with stand-alone Hayes-compatible modems. You also need at least 5MB of free hard disk space and 4MB of RAM.

If you have difficulties linking to Schwab—or any problem for that matter—and you've tried the excellent manual's troubleshooting tips, call Schwab's toll-free electronic-services support. You'll find the staff prompt, helpful, and pleasant (and available Monday through Friday from 6 a.m. to 7 p.m. Pacific time).

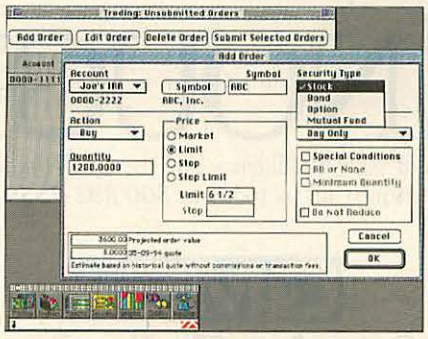
StreetSmart's interface lets you work quickly. The main screen has a floating tool bar with buttons for the commands you're likely to use most often—Trading, Positions (account holdings), Transactions, Securities, Graphs, Quotes, and Hang up. Most of these are also in the pull-down menus.

Monitoring the Market

Retrieving real-time quotes in StreetSmart takes minimal effort: just click on the Quotes button in the tool bar, type the ticker symbol of the company name, and click on the Get Quotes button. The quote appears almost instantly. (Some commercial online services also offer quotes, but generally those quotes are delayed by 15 minutes.) The Extended Quotes option gives you extra information, such as a security's 52-week high and low, whether it pays dividends, and its price-to-earnings ratio. Each time you download a quote, StreetSmart saves the data to a price-history list. You're given 100 free quotes with the program, and another 100 each time you execute a trade with Schwab (online or not). After you've exhausted your free quotes, it's $1.45 per real-time quote during market hours and 35 cents per minute after hours.

For research purposes, StreetSmart gives you access (via CompuServe) to Dow Jones News/Retrieval Service and Standard & Poor's MarketScope, from which you can download company reports, news wires, and all manner of financial data. Beyond one free hour on each service, the cost is $1.50 per 1000 characters. The partially obscured display makes it awkward to scroll and read text, but if you change the research-data font to 9-point Geneva, all of the text should be visible.

Within StreetSmart you can buy and sell stocks, bonds, options, and both Schwab and non-Schwab mutual funds. You can execute transaction types such as market, limit, and stop-loss orders, including GTC (good till canceled) orders and special conditions (see "Be Your Own Broker"). Except for a short chapter on terminology used in the program, StreetSmart's manual doesn't explain investment terms such as these; to gain an understanding of finance, you'll need to turn to other sources.



Be Your Own Broker If you want to see a stock price on a rising trend before you buy, choose the Limit option and specify at which price you want to buy, and how long you want the order to stand.

Protection against error is built in: after filling out your order, you must submit it to Schwab via a separate dialog box. Alternatively, you can save the order as unsubmitted and change, delete, or place it later. If you submit it, you immediately receive an on-screen confirmation. To change or cancel a standing order, you can check the real-time status to see if the order is still open. Alas, you can't bypass a live broker entirely: the order form doesn't give options to reinvest dividends or post them to your account. And for limit and stop orders you must call a broker to see if the trade was executed, or check your balance online the next day.

Instead of waiting for the mail to bring your monthly balance, you can use StreetSmart to download your Schwab account balances anytime—including cash, security market values, margin accounts, dividends and interest, and free-quotes balances. Schwab updates your accounts once a day between midnight and 2 a.m. Pacific time. You can add information for non-Schwab accounts, but you must update it manually.

StreetSmart's portfolio-managing capabilities are adequate but not comprehensive. The standard report, or Positions view, displays your holdings' unit purchase price, current price, total market value, and unrealized gains and losses. You can customize views to include, say, your holdings in the same report as your children's. Unfortunately, price-quote dates do not appear automatically in Positions views but instead show the dates you printed the quotes; to get around this you must edit the dates in the Transactions view. To record transactions, you have to enter by hand the price, date, and purchase type (which, annoyingly, kept defaulting to Unknown even after I chose Stock). If you need more-powerful financial management, turn to Intuit's superpopular Quicken (for details on version 5.0, see *Reviews*, in this issue). If you already use Quicken, you can employ StreetSmart to export quotes and transaction data. You can also *import* Quicken data to StreetSmart.

The Last Word

If the low price and free quotes aren't enough to bring you in, Schwab sweetens the deal with $25 off your first online trade, 10 percent off commission fees for all online trades, and outstanding toll-free technical support. If Schwab is where you want your investments held, and if you want to have tighter control over your portfolio and save on broker fees, StreetSmart's minor liabilities shouldn't keep you from considering it seriously.

—JACQUELINE KAN

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Circle 288 on reader service card

ClarisWorks 3.0

Integrated Software

PROS: Good implementation of intelligent Assistants; still fast and friendly for users with older Macs. **CONS:** Largely unchanged since previous version; dim-witted word-count feature.
COMPANY: Claris Corporation (408/727-8227).
LIST PRICE: $129.

MW ★★★★

CLARISWORKS IS THE BEST-selling integrated software package for the Mac, and with good reason: it's inexpensive, easy to use, surprisingly powerful, and a frugal user of system resources such as RAM and hard disk space. This last quality makes it especially attractive for people with Macs that aren't quite on the cutting edge, such as older 68030-, 68020-, and even 68000-based models. ClarisWorks 3.0 adds a few new features but mostly sticks to the well-worn trail blazed by ClarisWorks 2.1. The program still has six environments: word processing, drawing, database, spreadsheet, communications, and a 24-bit painting module. As before, integration between the different environments is excellent.

Like ClarisWorks 2.1, version 3.0 runs on 680X0 Macs and in native mode on Power Macintoshes. But because ClarisWorks is such a responsive program, it really doesn't benefit much, if at all, from the extra speed of the PowerPC processor. I found virtually no difference in the apparent speed of the program when running on a 68040 Mac or a Power Mac.

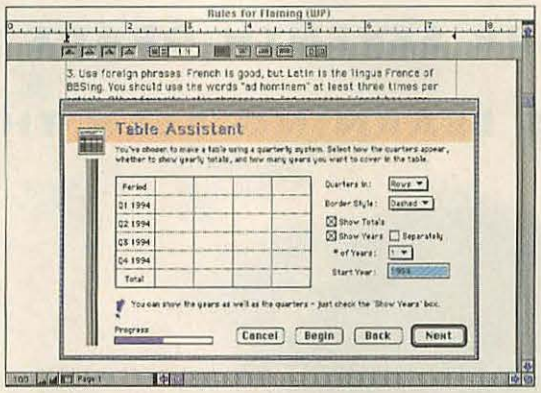
The Real News

For its main new features, ClarisWorks 3.0 offers eight Assistants, which help users create new, formatted documents and make it easier to add complex elements, such as tables or footnotes, to a document. Assistants step you through a process by asking a series of questions via several dialog boxes, then create a document based on your answers. There are Assistants for creating tables, footnotes, and envelopes in the word processor; calendars using the spreadsheet; newsletters and presentations in the draw environment; and address lists in the database. A Find Assistant helps you locate ClarisWorks documents that contain a particular word or date.

Assistants are reminiscent of the Wizards found in most of the current Microsoft programs, such as Works 4.0, but with a key difference: Wizards only help you make new documents, whereas Assistants can help you add to existing documents. I found the Assistants quite useful, especially the ones for table creation and for creating the database address list, which saved lots of drudgery by creating and formatting fields for me. Another nice thing about the Assistant technology is that it is extensible, so you can add new Assistants just by copying them to the Claris folder on your hard disk. Claris expects to produce new Assistants in the future and is also evangelizing third parties to write Assistants.

Minor Additions

The program finally has a word-count feature, which can count characters, words, lines, paragraphs, and pages. That's fine, except that it only gives you this information for an entire document.



Assist Me The intelligent Assistants make it easy to add complex elements to an otherwise pedestrian letter or report. Here, I'm adding a table with quarterly results to the current document.

It apparently didn't occur to the ClarisWorks team that users might want a word count for a block of selected text. Even when creating a newsletter in the drawing environment, you can't get a word count for one block of selected text. This is an inexcusable oversight.

Another change to ClarisWorks affects Windows users more than Macintosh users. ClarisWorks 3.0 has been released for both platforms simultaneously, and the Windows version now has all the functionality of the Mac version. Claris says that files for the two versions are now binary-compatible, which means no translation is necessary when transferring ClarisWorks 3.0 files from Windows to the Mac or vice versa. For companies that use ClarisWorks on both platforms, this could result in a time savings. I did not test cross-platform compatibility, however.

Normally, a product changes significantly with a major version-number upgrade. That is not the case with this revision of ClarisWorks. The Assistants, word-count feature, cross-platform file compatibility, and import filter for MacWrite Pro are the most notable changes. Claris has also included 75 clip art images, 7 Monotype fonts (primarily for Windows compatibility, but they're useful on the Mac, too), and a new walk-through tour of the program. And version 3.0 lets you (with System 7.5) drag and drop clip art from the Finder to a ClarisWorks document.

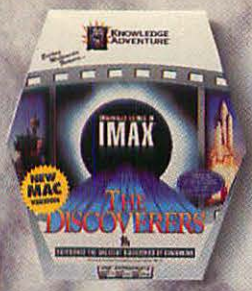
Missed Opportunities

In choosing not to substantively revise the program, Claris missed the chance to improve some of ClarisWorks' shortcomings. In the word processing environment, you still can't have an outline and regular text in the same document; you must be in one mode or the other. And there's still no Expand All command in the outliner. You can set up and name character styles but not paragraph styles, so it's not as easy as it should be to format boilerplate documents.

It would have been nice to see some simple scripting added to the database. You might think that advanced users could add automation to the program via AppleScript, but you would be wrong. Incredibly, Claris has chosen to eliminate access to the core AppleScript support that version 2.0 had. This is especially puzzling and disappointing as several other Claris products boast excellent support for AppleScript. Also, the communications environment still doesn't come with a modern file-transfer tool, such as one with the Zmodem protocol; you're stuck with less-efficient transfer methods like Xmodem and Kermit.

The Last Word

ClarisWorks 3.0 may be a bit disappointing because of the relative lack of new features, but that shouldn't take away from the fact that ClarisWorks is still hands-down the best integrated-software package available for the Mac. ClarisWorks is far better in terms of features, speed, integration, and use of system resources than its main competitor, Microsoft Works 4.0. If you're looking for an integrated program, ClarisWorks is the one to buy.—TOM NEGRINO



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Norton Utilities for Macintosh 3.1

Utilities Suite

PROS: Strong disk repair and basic data recovery; performs background damage checks; powerful disk editor; excellent manual; improved interface; Power Mac–native versions of some modules. **CONS:** Weak backup module; some valuable features from previous version eliminated; no System 6 support; some lingering bugs. **COMPANY:** Symantec Corporation (503/334-6054). **LIST PRICE:** $149.95.

MW ★★★

NORTON UTILITIES FOR MACINtosh (NUM) 3.1, the long-awaited upgrade to Symantec's flagship data-protection and -recovery utility, is leaner, meaner, and faster than ever before. Yet, though built on the solid foundation of NUM 2.0.6 and bolstered by Public Utilities 2.0, NUM 3.1 is surprisingly uneven.

Prevention and Cure

A six-button palette gives access to Norton Disk Doctor, UnErase, Volume Recover, Speed Disk, Norton Fastback, and System Info. These and more are also accessible from the Utilities menu.

No single disk-repair utility is best at everything, but Norton Disk Doctor leads the current pack. It checks volume directories for corruption, which it can usually correct. It also cures minor file anomalies and media damage. The new version finds and fixes problems that NUM 2 and MacTools' DiskFix don't even detect, and is much faster than both.

The FileSaver control panel creates invisible files that NUM uses to restore damaged directories and recover deleted files. The new Prevention feature checks for directory damage at start-up, at shutdown, and/or after idle time. FileSaver can also check for media damage and inform you of the need to optimize or back up. When it spots a problem, an alert flashes and prescribes the appropriate NUM module—an excellent feature, as the best use of NUM is fixing small problems before they become big ones.

When Disk Doctor can't fix a volume, it sends you to Volume Recover, which offers to restore the volume "in place" based on a FileSaver directory "snapshot." In my tests, it worked flawlessly and fast. Note, however, that because you might have a snapshot of an already corrupted directory, and because backup directory files are themselves subject to corruption, it's safer if you first recover files, then attempt to repair or restore the volume. Both the NUM manual and program stress repair and restoration first—expedient, but a bit imprudent.

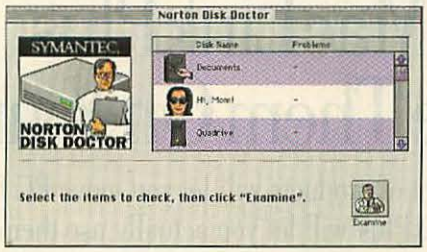
UnErase can recover files from a damaged volume or rescue files that have been deleted from the Trash. Of this module's several new features, most welcome are the ability to sort scan results by degree of recoverability and the option to filter unrecoverable files.

However, the new UnErase omits some features that were in NUM 2. This simplifies the interface and the everyday recovery of trashed files, but it poses big problems for big data-recovery jobs. If you have complete, current backups, these omissions won't affect you, but they reduce NUM's value as a serious data-recovery tool—something for which it used to be the best commercial option.

Backing Up

Your first line of defense against data loss should always be backups; repair and recovery are steps to take when disaster strikes between backups or when backups fail. But if I had to use Norton Fastback, which replaces the older Norton Backup . . . well, I wouldn't. To start with, it's not backward-compatible; you need to keep Backup around to access pre-Fastback files. This might be acceptable if Fastback were clearly superior, but it isn't.

On the plus side, Fastback adds support for tape drives, self-extracting backup files, backups in standard Finder file format, and error correction. In the minus column, Fastback can back up changed files only for entire volumes, not custom sets of files. If you attempt two types of backups for a volume, Fastback "forgets" the first one. You can't view or edit a set. Fastback can't create sets of multiple volumes; you can run single-volume sets in sequence, but Fastback rewinds tapes to the top and searches for free space within each set, which can add hours to such routines. In short, Fastback is the wrong choice for a package promising "comprehensive data protection."



Not Just a Pretty Interface Disk Doctor's improved interface permits more efficient diagnostics.

Speed Disk, NUM's disk optimizer, is speedier than ever, especially on Power Macs (thanks to native code). The improved interface lets you select multiple volumes and see the total number of files and the percentage of fragmentation per volume. You can choose which files to defragment from a list of fragmented files giving size and number of fragments.

Gone is a nasty bug from version 3.0 capable of damaging large numbers of files, but there's still a risky conflict with FWB's Hard Disk ToolKit; the fix is in HDT 1.3.1 and later versions.

Norton Disk Editor gets down to the lowest logical level of your data and disk structures. This is a technician's tool that most users will never need, but sometimes it's your only way to rescue a damaged file, or even an entire disk. The new Disk Editor has a smoother interface, templates for more areas of the disk, and more power to copy and paste between sectors.

Norton Security

Normally, when you delete a file, the system simply modifies the entry in the directory to indicate available space; the data itself remains on the disk. That's why NUM can recover deleted files—and how file security can be breached. Wipe Info makes sure a file, folder, or disk can't be recovered, by writing over the data up to three times. You can also create a Wipe Info Trash for drag-and-drop "shredding." (At press time Symantec was addressing a bug in Wipe Info that causes some Macs to crash.)

NUM 3.1 finishes off with a handful of lightweight utilities such as Startup Disk Builder, System Info, and Floppier—some new and some carried over from NUM 2. None are so compelling or so weak that they should influence your buying decision one way or another. However, this version of NUM doesn't support System 6; if you haven't upgraded to System 7, stick with NUM 2.

The Last Word

A utility collection such as NUM should be strong in all major departments. Had Symantec left well enough alone with UnErase and included a first-rate backup module, that would have clinched it. Instead, NUM is neck and neck with the competition: Symantec's own, patchy MacTools 3.0 (4.0 came out at press time). Still, for its best features I recommend NUM 3.1 highly.—PETER M STOLLER

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Paint/Draw Programs for Children

Art Software

Art Explorer 1.0

PROS: Fun interface for children; provides excellent painting tools for the price; appealing cartoon-style art. **CONS:** Requires 14.8MB of hard disk space; unusably slow on a 68030 LC/Performa machine; some frustrating features. **COMPANY:** Aldus Consumer Division (619/558-6000). **COMPANY'S ESTIMATED PRICE:** $49.95.

MW ★★

Flying Colors

PROS: Makes excellent use of stamps and color-cycling; provides easy-to-use tools to transform stamps and make your own. **CONS:** Only one drawing can be open at a time; formal art style. **COMPANY:** Davidson & Associates (310/793-0600). **COMPANY'S ESTIMATED PRICE:** $40.

MW ★★★

FLYING COLORS AND ART EXPLORER solve a problem that plagues would-be computer artists of any age: how to create something that looks good when you can't draw. Both of these programs offer images (called stamps) for you to size, color, and place in background scenes, as well as tools for you to draw your own creations.

Flying Colors

Flying Colors has 11 scenes to choose from, including dungeons, underwater worlds, and planets in outer space, plus over 1000 nicely drawn stamps. Though the program offers a Small Kids mode, Davidson quite rightly bills Flying Colors for ages 8 to adult; even 8- to 10-year-olds might be frustrated by the small size of many stamps, and might not understand some of the more complex tools. And I'm not sure younger children would feel at ease with the art style, which is a bit formal and very professional looking.

Flying Colors makes particularly good use of color-cycling, a technique in which pixels change color through a range of shades, giving the appearance of motion. With color-cycling turned on, magic potions glow, cats have blinking green eyes, and you can spray twinkling stars onto a sky. Another fun tool is the symmetry tool, which lets you create up to 30 copies of a stamp or shape centered around an origin point.

Flying Colors is easy to use and allows you to create satisfying images quickly and with a minimum of trouble. It offers excellent scaling, rotating, and flipping tools, as well as brightness and opacity control, so that you can tailor-make your stamp, preview it, and quickly place it on a background. The only disappointing thing about Flying Colors is that, color-cycling aside, the images are rather static and formal looking.

Art Explorer

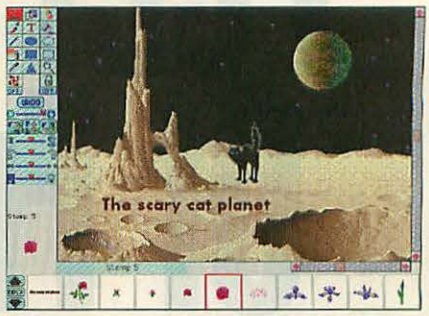
From the moment you launch this program—and a wild rock-and-roll riff plays—you're on notice that Art Explorer means to please the MTV generation. Art Explorer offers hundreds of cartoon-style stamps and eight background scenes from places such as Ghoulie World. While its cartoon style is refreshing and its features promising, Art Explorer is still rough around the edges.

In addition to sets of theme stamps for each scene, Art Explorer has Build Itz stamps, which provide pieces of characters that you can combine, and Color Itz stamps, which are outlines that you color in. The stamps are available in three sizes and are nicely drawn, but sometimes the smallest size is still too big for the background, while the largest stamps are sometimes bigger than the background.

Early Man Art Explorer stands out for its goofy cartoon-style backgrounds and stamps.

Art Explorer offers a nice tool set for transforming stamps, including tools for slanting, stretching, and placing stamps in perspective. But while these tools provide more features than Flying Colors' do, they're not as easy to use. Art Explorer's scale tool can shrink and grow stamps, but you can't control how much the stamps will be transformed. Flying Colors offers a more interactive sliding size control that lets you preview the resized stamp before you place it in a scene.

Art Explorer makes colors accessible through large, easy-to-see jelly-bean icons, but the colors are in no obvious order. Once you find the shade you want, though, Art Explorer has neat color controls, such as dyeing, which puts down a see-through layer of paint.



The Scary Cat Planet Flying Colors offers easy-to-use sliders for adjusting the size, rotation, and intensity of stamps.

The interface to this program is promising, providing access to all the tools from one central panel and using clear, large icons for each tool. It does have a few quirks, though. It's a bit jarring to find the Effects tools hiding in a menu next to the File and Edit menus, in an otherwise graphical presentation. Also, some icons have pull-down menus, but unlike with most Mac menus, you can't open a menu and select a tool by clicking and dragging.

Art Explorer's biggest limitation, though, is that it is unusably slow on a Mac with a 68030 processor. On an LC II with 4MB of RAM, it took as long as 20 seconds for a stamp to appear after being selected—too slow for all the children I know, as well as most adults. On a Quadra 605 the program ran much better but was still not fast. There were noticeable pauses when opening the program or switching between tools. And on a Centris 610 (68LC040), switching between drawings is painfully slow. Whatever machine you run it on, make sure you have 14.8MB of hard disk space available, since Art Explorer doesn't let you selectively install parts of the program.

The Last Word

Flying Colors will probably make your budding artist or sticker-book fanatic happy. While not the most dynamic kids' program, it provides easy-to-use tools and nicely drawn stamps. On the other hand, only budding artists with fast machines and some patience will enjoy Art Explorer, though it promises to be lots of fun once its quirks get ironed out.

—LIZA WEIMAN

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Microsoft PowerPoint 4.0

Presentation-Graphics Program

PROS: Customizable tool bars; online help and guidance for beginners. **CONS:** No tools or server for creating tables; minimal animation capabilities; incomplete manual. **COMPANY:** Microsoft Corporation (206/882-8080). **LIST PRICE:** $399.

MW ★★★

IN THE COMPETITIVE WORLD OF office-productivity software, standing pat is never a sound strategy. So, hard on the heels of Aldus Persuasion 3.0 (see *Reviews*, September 1994), Microsoft has released an upgrade to PowerPoint, its popular presentation-graphics program.

A complete installation of PowerPoint takes up more than 30MB on your hard drive, although you can cut the requirement in half if you omit certain components, such as the 12MB collection of clip art. (Microsoft's installer informs you about disk space usage, and you can add or remove most components later by running the setup program again.) At a minimum RAM allocation of 2800K, PowerPoint's memory requirement is relatively steep but not out of line with those of many applications.

Microsoft claims that PowerPoint 4.0 is compatible with any Macintosh equipped with a 68020 processor or higher; in my tests, performance was acceptable on both a Mac IIfx and a Quadra 650. (A Power Macintosh version should be shipping by the time you read this.)

Office Mates

PowerPoint 4.0 sports a new look that clearly reflects its kinship to Word 6.0 and Excel 5.0. Instead of the handlebar that let you page through presentations in previous versions, PowerPoint 4.0 uses arrows that you click on to jump from slide to slide. In place of fixed tool palettes, the new release offers seven separate tool bars. You can customize any of the tool bars by dragging icons onto them. The tool bars can float anywhere on the screen, or you can dock them at the top, bottom, or side.

One of the tool bars lets you launch Word, Excel, Mail, FoxPro, or Project with a single click. (PowerPoint can also share custom spelling dictionaries with its Microsoft Office companions.) Like Persuasion 3.0, PowerPoint 4.0 exchanges data with other programs using Microsoft's Object Linking and Embedding (OLE) protocol. For example, you can drop tables from Word 6.0, or spreadsheets from Excel, into PowerPoint presentations. The program ships with five OLE servers, including Graph 5.0 for designing graphs, Equation 2.0 for building mathematical formulas, and an application called Organization Chart for creating common types of org charts.

Although PowerPoint provides a few features missing from Persuasion (such as the ability to add stylized text to your presentations through a program called Microsoft WordArt), Microsoft's graphing application is less capable than its Persuasion counterpart, Aldus Chart. Also, PowerPoint doesn't come with a server for creating tables, as Persuasion does.

PowerPoint 4.0 incorporates intelligent guides called Wizards that are designed to help you create effective presentations. For example, the AutoContent Wizard starts off by letting you fill in information for your title slide. It then asks you what type of presentation you're planning: recommending a strategy; selling a product, service, or idea; training; reporting progress; or delivering bad news. Once you've picked the presentation type, PowerPoint automatically creates an outline of topics and subtopics for you to fill in. (PowerPoint's other built-in helper, appropriately termed the Pick a Look Wizard, is even less compelling: all it does is let you select a presentation style from a collection of templates.)

PowerPoint includes several other features that I found helpful. For instance, if you check the ToolTips option in the Toolbars dialog box, PowerPoint automatically displays the name of a tool when you point to it. Although ToolTips provides less information than does balloon help, it is far less obtrusive. PowerPoint 4.0 also provides online Cue Cards that give step-by-step instructions for performing common tasks, such as adding QuickTime movies or changing a presentation's colors.

Presentation Wizardry PowerPoint's AutoContent Wizard includes a General category for subjects that don't fit into any of the five predefined types of presentations.

PowerPoint's built-in documentation is comprehensive and easy to navigate, providing both general and context-sensitive help. In fact, in many cases the printed manual refers you to the online help for more information. Equally annoying is Microsoft's decision to ship identical manuals with the Mac and Windows versions of PowerPoint. For example, since almost all of the screen shots are from the Windows release, it's not clear that the Macintosh balloon help and the PowerPoint for Windows Help menu are one and the same.

Microsoft offers several technical-support options, ranging from toll-free recorded or faxed information to full-time telephone consultation at $2 a minute or $25 a call. Standard tech support is also available weekdays from 6 a.m. to 6 p.m. PST for the cost of a toll call; the engineer I spoke with was courteous and eager to offer useful tips and advice.

Animation

People who give on-screen presentations will be disappointed by PowerPoint's lack of animation tools; you are limited to making successive text items in a series fly onto the screen from the top, bottom, or side of the monitor. (In sharp contrast, Persuasion 3.0, although not as capable as Gold Disk's Astound, lets you animate graphics and text and create buttons to jump from place to place inside a presentation or launch another application.)

PowerPoint's lack of animation tools is especially surprising given PowerPoint's attention to detail in other areas. For example, clicking on a pencil icon at the bottom of the screen allows you to annotate slides while your presentation is running, and a Hide Slide feature allows you to omit selected slides from a presentation without deleting them entirely. PowerPoint also lets you record the timing of your presentation, a boon when you're practicing for situations in which time is tight. Like Persuasion, PowerPoint comes with a viewer you can distribute at no charge to people who don't have the PowerPoint application.

The Last Word

If you're in the market for a presentation-graphics program, PowerPoint 4.0 is a good choice to use along with Word or Excel, as long as you don't mind the lack of animation functions. For general purposes, though, Persuasion's table tools, more comprehensive charting features, and basic animation capabilities give it the edge over PowerPoint.

—FRANKLIN N. TESSLER

SuperCard 1.7.1

Authoring System

PROS: QuickTime movie support; enhanced animation functions; hypertext capabilities. **CONS:** No integrated manual; limited printing capabilities. **COMPANY:** Allegiant Technologies (619/587-0500). **LIST PRICE:** $495.

MW ★★★★

BACK IN 1987, HYPERCARD 1.0 SEEMED just the ticket for would-be Mac programmers who were too busy to learn C or Pascal. But as users quickly learned, HyperCard's card metaphor and scripting language left many Mac functions—color and multiple windows, for example—tantalizingly out of reach. Although you could add new features to the program via external commands (XCMDs) and functions (XCFNs), that was less convenient than having built-in support. And even in HyperCard 2.2 certain functions—including color support—are not as powerful as they ought to be (see *Reviews*, September 1994).

Two years after HyperCard's release, Silicon Beach Software introduced SuperCard, a program that overcame many of HyperCard's limitations while retaining the programming approach HyperCard pioneered. SuperCard gained a loyal following and later underwent two major revisions. Along the way, though, the Aldus Consumer Division acquired SuperCard and development ceased, leaving SuperCard in danger of becoming another orphaned program.

Luckily for SuperCard fans, Allegiant Technologies (a group of developers that includes SuperCard's inventor, Bill Appleton) acquired the rights to SuperCard from Aldus. Allegiant's SuperCard 1.7.1 squashes existing bugs and adds a few welcome enhancements.

Familiar Territory

As in earlier versions, the new package contains two major applications: SuperEdit, a program for building projects—it's the SuperCard equivalent of HyperCard stacks—and SuperCard itself, which you use to run projects. (A special program called Runtime Editor provides much of SuperEdit's functionality while you run a project in SuperCard, allowing you to make changes on the fly. You can configure Runtime Editor to appear with a full menu bar, as a single menu with hierarchical submenus, or as a floating palette with pop-up menus.) Like HyperCard 2.2, SuperCard lets you create double-clickable, stand-alone applications—but with an overhead about 200K smaller than HyperCard's.

SuperCard lets you access most of the Mac's tools, including multiple windows; colored graphics, text, and buttons; and hierarchical and pop-up menus. You can use SuperCard's built-in paint and draw tools to add graphics, and you can import pictures as either PICT or TIFF files. (SuperCard automatically dithers 24-bit images down to 8 bits, although you can get around this limitation using a supplied XCMD.)

As with HyperCard, the behavior of SuperCard objects is controlled by scripts written in SuperTalk, which is similar to HyperTalk. SuperCard's scripting window has pop-up menus at the top that list all of the words in the SuperTalk language, so you can enter them into your scripts without typing. SuperCard also includes a debugger called ScriptTracer that lets you step through scripts, monitor variables, and track memory usage.

New on the Menu

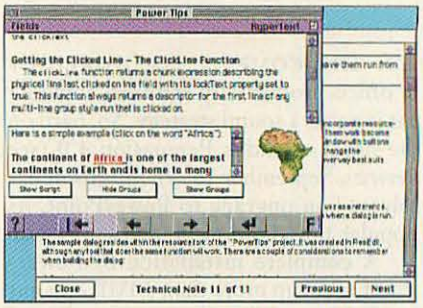
SuperCard now supports QuickTime movies; you can even add frames to existing movies without quitting the program. New SuperTalk commands give you control over the location and timing of movie playback. SuperCard's sound functions have also been upgraded. There's an option to preload sounds into memory to avoid delays during playback, there are monophonic sound-recording capabilities, and SuperCard can make your Mac speak text aloud if you have the proper system extensions installed.

Allegiant has beefed up SuperCard's animation features as well. For example, filmstrips consist of a series of tiled frames that you lump together into a single PICT file or resource; during playback, you specify the size of the individual frames, and SuperCard displays them one by one in rapid sequence. Filmstrips are handy for animating buttons and other objects, but unfortunately, SuperCard doesn't include a filmstrip editor.

If you're creating a hypertext document, a new text style called *group* lets you highlight all linked text with underscore characters, so users can tell which words have links associated with them. And three new SuperTalk functions allow you to determine when a user has clicked on a particular chunk of text, so your script can branch to the appropriate place. SuperCard's new dialog engine lets you use dialog boxes created with ResEdit or another resource editor.

Still Missing

Alas, SuperCard still lacks a few items. For example, SuperCard's built-in printing functions are not as comprehensive as they should be, and SuperCard doesn't provide enough choices of visual effects for transitioning from one card to another. Even more notable is SuperCard's lack of support for AppleScript. I'd also like



New Links With SuperCard 1.7.1, it's easy to create fields that contain linked hypertext, which appears underlined to make it readily visible.

an integrated script compiler, even though SuperCard's performance on a Quadra is already quite good. (A native Power Mac version should be shipping by the time you read this.)

My biggest complaint, though, is with the scattered nature of SuperCard's documentation. The user guide is clearly written and illustrated, but it covers only version 1.0; you have to read a separate addendum to learn about any changes that appeared in subsequent releases. A script language guide provides an alphabetical reference to all SuperTalk words, and a fourth manual guides you through the SuperCard tutorial, which reviews the new version's main features. Allegiant needs to incorporate the user guide, addendum, and script guide into a single volume, as well as provide project examples on disk.

The Last Word

If you're already using SuperCard, the upgrade is well worth the $89 that Allegiant is charging registered users. Unfortunately, SuperCard is far from a household name, making it difficult to attract a new audience for the product.

Allegiant calls SuperCard a multimedia authoring system, and the program does indeed offer an excellent alternative to more-expensive tools like Macromedia Director. Aggressive marketing, a fast Power Mac release, and a more powerful version 2.0 will help ensure SuperCard's success in the long term.

—FRANKLIN N. TESSLER WITH HARJIT SINGH

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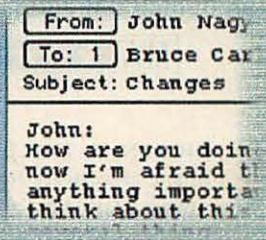

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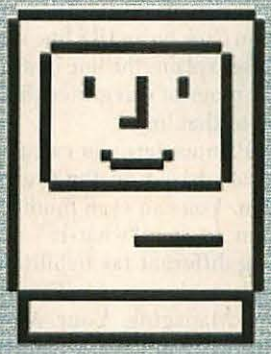

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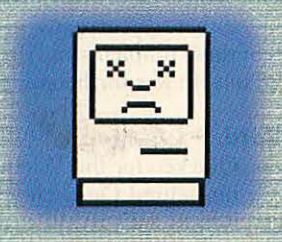

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Circle 66 on reader service card

Quicken 5.0

Personal Financial Software

PROS: Easy to use; powerful; new Financial Calendar puts monthly finances in one window. **CONS:** Some minor bugs; recurring transactions need more flexibility. **COMPANY:** Intuit (415/322-0573). **LIST PRICE:** $49.95.

MW ★★★★

QUICKEN IS THE BEST-SELLING financial software across all personal computer platforms, and it's not hard to understand why: it's easy to use yet loaded with features that help you take control of your finances.

Many of the new features in Quicken 5.0 are changes designed to make the program easier to use. There's now an icon bar with buttons that provide graphical access to Quicken's features. The new QuickMath feature lets you pop up a "paper tape" calculator in any dollar-amount field, which is useful for adding up several numbers when you want only the total. QuickMath also lets you set up macros for frequently used calculations, such as currency conversions or sales-tax calculations. The online help system has been improved, with a new, question-based how-to interface.

The most useful improvement, Financial Calendar, gives a picture of your transactions over time. Transactions appear on the day they occur; future transactions appear in blue type on the future date. To schedule a transaction, you can double-click on a date in the calendar; that brings up a register screen for the date, description, category, payment or deposit transaction, and so on. Via pop-up menus, you can also select one of ten preset intervals (weekly, quarterly, bimonthly, and so on) for recurring transactions, and you can have Quicken remind you of a transaction a specified number of days in advance.

You can also drag a transaction onto Financial Calendar from the program's QuickFill list. The QuickFill feature automatically completes an entry every time you enter a transaction. For example, the next time you type the first few characters of a transaction with a payee you've entered before, Quicken completes the remaining data. You can also drag and drop any QuickFill transaction onto the check register, and you can now drag and drop categories onto the register to save typing.

There are a few limitations for recurring transactions. You can't specify that transactions occur on a particular day of the month (such as on the second Friday of every month). Neither can you set a recurring transaction for the last day of every month. Say your company pays you on the 15th and the last day of the month. The 15th is no problem; but because months have 28, 30, or 31 days, you must manually create 12 transactions—one for the last day of each month.

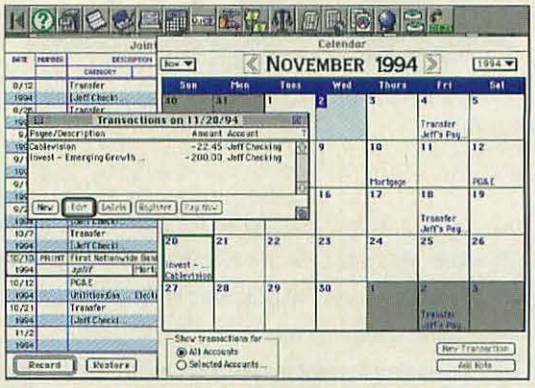
Intuit's Tax Planner module allows you to use your financial data to estimate your base tax position and to create up to two alternate tax scenarios. Tax Planner uses the improved Tax Links to assign some or all of your Quicken categories to specific line items on the IRS tax forms. When you click on an IRS line item, help text briefly explains the line item and suggests the types of categories that can be assigned to that line.

Tax Planner lets you calculate your tax position based on the Quicken information. You can even modify the information to get "what-if" scenarios reflecting different tax liabilities. With Quicken's inclusion of Tax Planner, MECA's Managing Your Money no longer has a competitive advantage in this area. Intuit also sells MacInTax, which reads Quicken files and uses Tax Links to complete your tax return. I did not test MacInTax and Quicken together, however, as MacInTax for the tax year 1994 had not yet been released.

Some of the changes are long overdue. The Reconciliation window is now larger and resizable. You can now sort transactions by type, number, or date. Quicken Quotes lets you download stock and mutual-fund quotes via your modem, and the updated price is automatically entered into your records; you can download the quotes either from CompuServe or from Intuit's new 900 number. The 900 service costs $1 per minute, and most calls take less than a minute. Investment portfolios now give price histories in text lists, in addition to the price graph.

Quicken's reports have been improved, mainly with the addition of two report types. Most useful is the QuickReport, which allows you to show all transactions for a particular payee, category, or account. Quicken has finally added a Comparison report type, which displays an income-and-expense report for two user-selected time periods. For example, you can see your expenses for the current year and compare them with last year's expenses.

Quicken 4.0 required several maintenance releases, and it appears that Quicken 5.0 needs one, too. The first bug I found is a problem with converting Quicken 4.0–created Memorized Reports to version 5.0: any reports that contain a "Year to Date" date range always display the date on which the report was converted to Quicken 5. Another problem arose while the program converted large (close to a megabyte) Quicken 4 data files to Quicken 5 format. On several occasions, Quicken 5 froze during the conversion, and I had to restart the computer. (Quicken 5 automatically backs up the Quicken 4 files before it attempts to convert them, so data loss is not a problem.) Technical support suggested an easy work-around: open and reindex the data in Quicken 4 before conversion (by pressing ⌘-option-B), then use Quicken 4's Save a Copy command to get a "clean" Quicken 4 file, which then converts easily. Intuit told me that the company was aware of both of these problems and that a maintenance release was forthcoming.



Your Future Finances Note Quicken's new icon bar, which lets you access features with one click. Double-clicking on a date in Financial Calendar brings up a listing of that day's scheduled transactions, which you can then edit.

The Last Word

As good as it is, Quicken for the Macintosh still lags a bit behind Quicken for Windows, which has a CD-ROM with useful financial tools and reference information. I'd like to see Intuit bring the Mac version up to parity with the Windows version. Quicken 5 is an incremental but still welcome improvement over the already excellent previous version. The addition of Financial Calendar and new ease-of-use features keep Quicken comfortably in front of the financial-program pack. If you're unhappy with your current finance program, it's worth taking a look at Quicken to see if it meets your needs. If you're not already using a personal financial program, Quicken 5 is the one to get.—TOM NEGRINO

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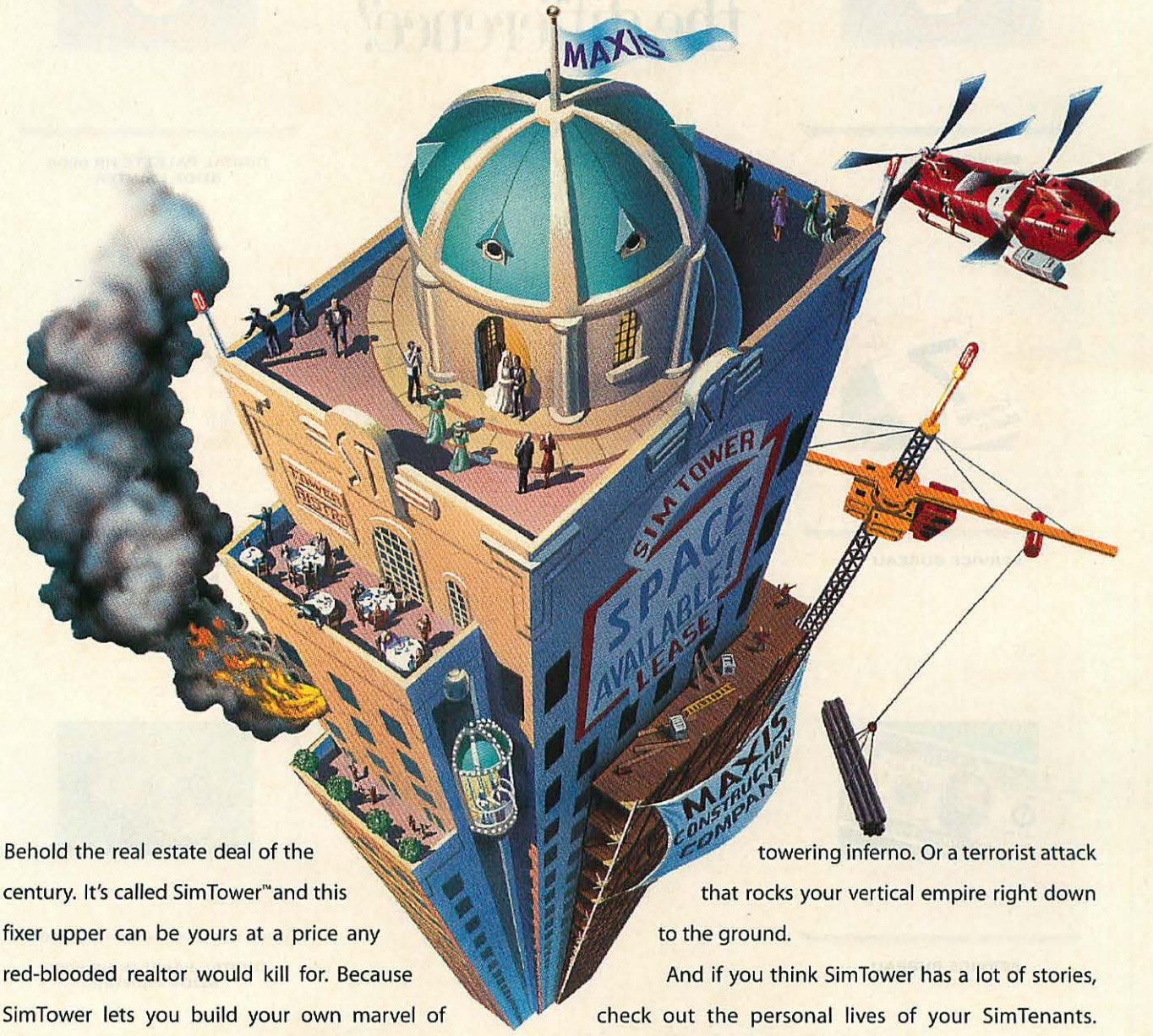

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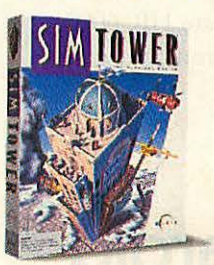

The Vertical Empire.

Macworld

Clue 1: SimTower

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Polaroid

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Clue 1: SprintScan 35

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Circle 295 on reader service card

Norton DiskDoublerPro 1.1

File-Compression Utility

PROS: Good compression efficiency and speed; some good features removed in last version have been restored. **CONS:** Limited ability to convert other compression formats; minor bug with System 7.5. **COMPANY:** Symantec Corporation (503/334-6054). **LIST PRICE:** $109.

MW ★★★★

THE NORTON DISKDOUBLER Pro package is a new name for a collection of utilities that was formerly sold under the name SuperDoubler. DiskDoubler Pro includes DiskDoubler (DD), a utility that compresses files, thus freeing disk space; AutoDoubler (AD), which searches your hard disk for files to automatically compress when the Mac is idle; and CopyDoubler, a utility that speeds up copying files in the Finder.

Symantec has rewritten the two programs in native Power Mac code. The programs' installer includes both 680X0 and native PowerPC code.

DiskDoubler, the core program in the package, has five levels of compression from which to choose. AD1 and AD2 are used for automatic compression with AutoDoubler; they compress quickly but not tightly. The remaining three levels—DD1, DD2, and DD3—all use the same compression algorithm, but they trade compression time for compression efficiency. In my tests, compression speeds improved using a Power Macintosh.

After many complaints from users, Symantec has put back a feature removed from the last version of DiskDoubler: the ability to double-click on a file in the Finder and have it transparently decompress and then launch. The last version required that you double-click the file once to decompress it, then again to launch it. Version 1.1 lets you select either method via a Preference dialog box.

While previous versions allowed you to drag and drop files onto the DD application icon to compress them, DiskDoubler Pro lets you hold down the shift or control key when you drag and drop a file, which brings up a dialog box for changing the compression method.

AutoDoubler compresses files on your hard disk unobtrusively, and you should have to set CopyDoubler preferences only once. DiskDoubler Pro has lost none of its easy sophistication.

DiskDoubler converts StuffIt files (both archives and SEAs) to any of its own formats, but it has no other conversion capabilities. If you frequently send files via modem, you'll probably want to use Aladdin Systems' StuffIt Deluxe package, which includes conversion utilities for many different compression formats.

If you use System 7.5 and turn on balloon help and point at the DD menu in the Finder, you get a false informational balloon referring to the "Printing Menu." Symantec is aware of the problem and promises to fix it in a maintenance release.

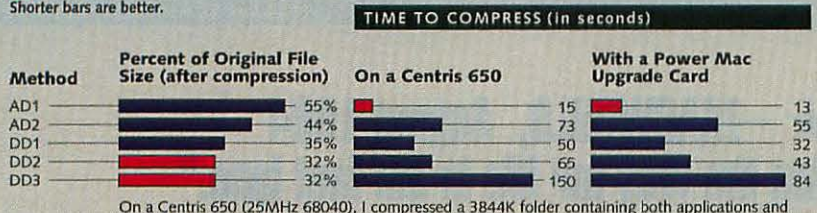
The Last Word

The Norton DiskDoubler Pro package is a worthwhile investment if you want to squeeze more space onto your hard disk. Because of its ease of use, the package is also a good choice for beginners. AutoDoubler offers an excellent range of transparent compression options, and DiskDoubler works well for archiving and compressing files manually. CopyDoubler substantially speeds up copy operations in the Finder; you'll soon wonder how you ever got along without it.

If you own a Power Mac, DiskDoubler gives a significant speed boost; and if you're a SuperDoubler owner, take advantage of the free upgrade. But if you own one of the other Symantec standalone packages, you'll have to decide whether it is worth the $39.95 to get the missing pieces.—TOM NEGRINO

Folder Crunching

Best result in test. Shorter bars are better.



On a Centris 650 (25MHz 68040), I compressed a 3844K folder containing both applications and documents using each of DiskDoubler Pro's compression methods. I then compressed the folder using the same machine with an Apple Power Macintosh Upgrade Card installed.—**Tom Negrino**

Joule System

Modular Storage Unit

PROS: Simple cabling; drives (except drive in base unit) can be easily swapped; wide selection of storage media. **CONS:** Prices are higher than competition; knobs on stack mounts sometimes difficult to turn; occasional problems connecting modules. **COMPANY:** La Cie (503/520-9000). **LIST PRICE:** Varies by component; $2837 for system shown.

MW ★★★

MW LAB THE PROMISE OF THE LA CIE JOULE system is clear: to eliminate the clutter and cost of SCSI and power cables, while reducing the expense of drives and their enclosures. This plug-and-play tower lets you stack drives—including hard drives, removable media, and other modules—atop a base unit, making it easy to buy extra storage or swap modules with other Joule towers.

Some may like the Joule system for its modular, flexible design and all-black, deconstructionist style. However, to many, function and price are more important than convenience or aesthetics. In fact, the Joule system is more expensive than other drives. And as I found out, putting all your trust in a single power supply is unwise.

The Joule system stacks Joule modules—boxlike cases that contain drives—on top of a Joule base unit. The base contains your choice of several drives and has a 100-watt power supply that feeds all of the tower's modules. An internal data and power bus extends vertically from the base unit, through vertebrae-like Joule mounts, to the Joule top cap. The top cap completes the internal bus and contains the cable that connects the Joule to your Mac or SCSI chain. Joule mounts are the docking bays for the drive modules. They contain activity lights, a SCSI ID switch, proprietary connectors, and plastic guide rails, which the modules slide along to connect with the Joule system.

Modules come in many varieties. Hard drive choices range from a 340MB Quantum ($319) to a 4300MB Quantum ($2869). You can also purchase a 230MB Fujitsu magneto-optical drive ($799), a 105MB or 270MB SyQuest drive ($369 and $499), a 600MB Teac tape drive ($789), or a digital audiotape drive ($1199). Each module has its own fan, and the price includes a Joule mount. Many, although not all, drives are available as base units. Expect to pay an additional

continues

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Circle 132 on reader service card

$30 to $80 (most likely about $70) for a drive with the base unit. Without a drive, the base unit costs $199.

You can move drive modules to another location easily, if your destination has a Joule system. For people who want portability, La Cie now offers a Joule Portable Dock ($149) for nearly all its drives. A portable dock and module cost the same as a mount and module, but to include the module in a stack, you'll need to buy an additional mount ($69).

In price comparisons with products from other drive vendors (APS, Club Mac, and Spin Peripherals), the Joule doesn't fare well. Prices vary widely, averaging about $45 higher for the Joule module and mount, and $120 higher for a drive with the Joule base. Notably,

SCOTT PETERSON

230MB magneto-optical drives and Quantum 2.5-inch hard drives (not offered with the base unit) are *less* expensive in the Joule system.

But as important as price is reliability. During my tests, the fan in the Joule's base unit failed, leading to a problem with the drive it housed, and ultimately to a SCSI problem that crashed my Mac. People who are going to stack all of their business data on a single power source should consider buying an additional base unit to use during possible downtime.

I also had difficulty turning the three knobs that attach the Joule mounts. And occasionally, after I moved a module, the module didn't work on the first try, so I needed to pull it out and reconnect it. In fairness, though, fans and drives do occasionally fail, and you may need to reseat the SCSI cables in any product from time to time.

The Last Word

Although I was underwhelmed, the Joule generally works well. If you expect to expand your storage rapidly and you like bold fashion statements, consider the Joule system. Otherwise, keep shopping around.—TIM WARNER

Medical HouseCall 1.0

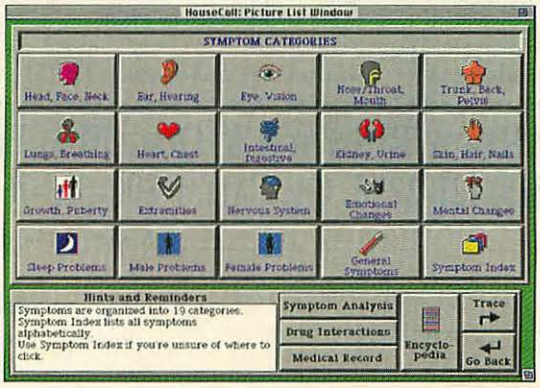
Home Medical Guide

PROS: Easy to use; good use of hypertext. **CONS:** Some medical images are incorrectly labeled; simple illustrations. **COMPANY:** Applied Medical Informatics (801/464-6200). **LIST PRICE:** $99.95.

MW ★★★

WITH THE BEWILDERING RANGE OF choices faced by consumers nowadays, it's more important than ever for individuals to take an active role in managing their own health care. Medical HouseCall, a new interactive medical guide from Applied Medical Informatics, is a painless way for people to learn about diseases, tests, and therapies. To install Medical HouseCall, you need 11MB of disk space, although you can get by with as little as 4MB if you don't install all the sections. You can run the program in black-and-white, but it looks best on a color monitor. HouseCall sports a clean interface that's a cinch to use, even without reading the manual. (The only glitch I encountered was the overwriting of text and buttons when I made the window too small.)

Medical HouseCall is divided into four main parts: symptom analysis, drug interactions, medical records, and an encyclopedia. Armchair diagnosticians will enjoy the section on symptom analysis most of all. You begin by entering your age and sex and choosing a symptom category (see "Where Does It Hurt?"). After you have responded to a suite of yes-or-no questions about what's troubling you, you can answer follow-up queries or enter more symptoms in another category.



Where Does It Hurt? Medical HouseCall lets you enter symptoms in up to 19 different categories. If you're not sure which one to choose, the index shows all the symptoms in HouseCall's database.

Eventually, HouseCall offers a list of possible diseases, with percentages indicating the likelihood that each illness is actually causing your symptoms. Clicking on an entry displays information about that condition from HouseCall's database. As you would expect, the more information you provide, the more accurate HouseCall's guesses are likely to be. Still, because the program can't take into account vital information such as physical-exam and lab results, don't expect it to substitute for a trained medical professional, a caveat echoed by frequent disclaimers.

While not quite as entertaining as symptom analysis, HouseCall's remaining three sections are even more informative. For example, you can query the computer about the potential interactions and side effects of almost 3000 medications, from aspirin to zyloprim, including alcohol and caffeine. HouseCall also provides valuable pointers on the proper use and special cautions for each drug. For the truly compulsive, another section lets you create a comprehensive medical record for everyone in your family. (If you're worried about being *too* compulsive, there's a section on obsessive-compulsive disorders.)

HouseCall's medical encyclopedia lets you access a variety of topics, including drugs, diseases, medical tests, injuries, poisons, and nutrition. Throughout the program, clicking on colored text (which shows up in bold on monochrome monitors) brings up more information about that particular item.

My only serious gripes with the program are with the quality and accuracy of the pictures in HouseCall's database. Most of the artwork is in the form of line drawings (possibly to conserve disk space); I would like to see a CD-ROM version with full-color photos and renderings. Worse yet, I found several cases where medical images were labeled incorrectly (for example, the spine MRI actually shows a CT scan of the abdomen, and the pregnancy ultrasound is really from a heart exam).

The Last Word

Even though Medical HouseCall isn't perfect, I recommend it for anyone interested in becoming more knowledgeable about health care.—FRANKLIN N. TESSLER, M.D.

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Vistapro 3.0

3-D Landscape–Rendering Software

PROS: You can add external features such as buildings and rivers to a scene. **CONS:** Limited camera movement when making QuickTime movies; difficult to visualize scenes from wire-frame view. **COMPANY:** Virtual Reality Laboratories (805/545-8515). **LIST PRICE:** $149.95.

MW ★★★

GEE, TOO BAD YOU CAN'T AFFORD to take that Yosemite vacation this year. But you can take a virtual hike with Vistapro. Set up your simulated camera; point it up at Half Dome; add a couple of trees, some clouds, and a dusting of snow; and select Render. For added verisimilitude, you can render the scene as a stereo image (Vistapro creates two slightly offset images) to view with those red-and-blue glasses left over from the last 3-D movie you attended. So it's not the real thing—at least you don't have to worry about getting stuck behind a Winnebago heading up Tioga Pass.

Vistapro uses digital versions of U.S. Geological Survey maps to render three-dimensional landscapes. You can accept their version of reality, or create your own by altering geographical features by adding lakes, streams, and oceans; lowering the timberline; or even eroding a mountain range. The program includes map data for portions of Yosemite, as well as for 18 other locations, including Big Sur, Mount Saint Helens (pre- and posteruption), and the Matterhorn; additional landscape maps are $34.95 each. You can also use Vistapro to generate your own fractal landscapes.

You set the viewpoint from which the scene will be drawn by positioning a virtual camera on a topographic map (see "Setting Your Sights"). Another window shows a wire-frame preview of how the terrain will look. You can adjust factors such as lighting; snow and tree level; cloud type and density; and the colors of elements such as trees, sky, and water. You can quickly create a rough preview of the image using low-quality rendering, then add shading and texture refinements—as well as rendering time—with a high-quality setting.

Vistapro is very similar to Natural Graphics' Scenery Animator (see *Reviews*, *Macworld*, August 1994). The two programs provide the same basic set of features and controls at the same price, but Vistapro offers a number of features not found in Scenery Animator: four types of trees (to Scenery Animator's two); a tool that creates houses (well, cubes, anyway); a slider to adjust haze; and the ability to add rivers, to import a PICT file as a background or foreground, to export a DXF file for use in a three-dimensional modeling program, and to create stereo or panoramic images.

But for all of this, Scenery Animator still surpasses Vistapro on several fronts. Scenery Animator's memory requirements are more modest (1800K versus Vistapro's 4000K), it rendered comparable scenes more quickly than Vistapro in the tests that I made, and it can render images in the background while you work in another program. And although Vistapro offers more types of vegetation (palms, cacti, oaks, and pines), Scenery Animator's trees look more realistic. Also, while both programs can generate QuickTime movies of landscape fly-throughs, Vistapro's are simpler (you can't bank the camera as you fly through a canyon, for example); to create more-complex animations, you need the optional MakePath Flight Director program ($69.95). Finally, the shaded polygons in Scenery Animator's preview window offer a better initial look at a scene than does Vistapro's wire-frame view.

Setting Your Sights When you position a virtual camera in Vistapro's topographic-map view, the Preview window displays a wire-frame version of the scene (as shown in the two rear windows). Before rendering the scene (frontmost window), you can alter colors; change the light source; and add landscape features such as trees, lakes, and snow.

The Last Word

Vistapro is a good program, accomplishing its purpose admirably, but unless you need some of Vistapro's special capabilities, I'd say Scenery Animator is a better draw.—ERFERT FENTON

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PostScript Downloaders

Download Mechanic 1.0.2

PROS: Fast; test mode and file analysis for debugging; can download selected pages. **CONS:** Must edit files within available memory; slow performance and occasional crashes when opening large files. **COMPANY:** Acquired Knowledge (619/587-4668). **LIST PRICE:** $249.

MW ★★★

Let'er RIP 2.0

PROS: Drag-and-drop downloading; automatic font and resource downloading; good support for Apple events. **CONS:** No debugging or troubleshooting tools. **COMPANY:** Lupin Software (916/756-7267). **LIST PRICE:** $239.

MW ★★★★

SERIOUS DESKTOP PUBLISHERS NEED some kind of PostScript downloader for sending fonts and PostScript files to their printers or imagesetters. Adobe's free Font Downloader and Apple's LaserWriter Utility (included with system software) work fine, but they lack several features that can save a lot of time and pain.

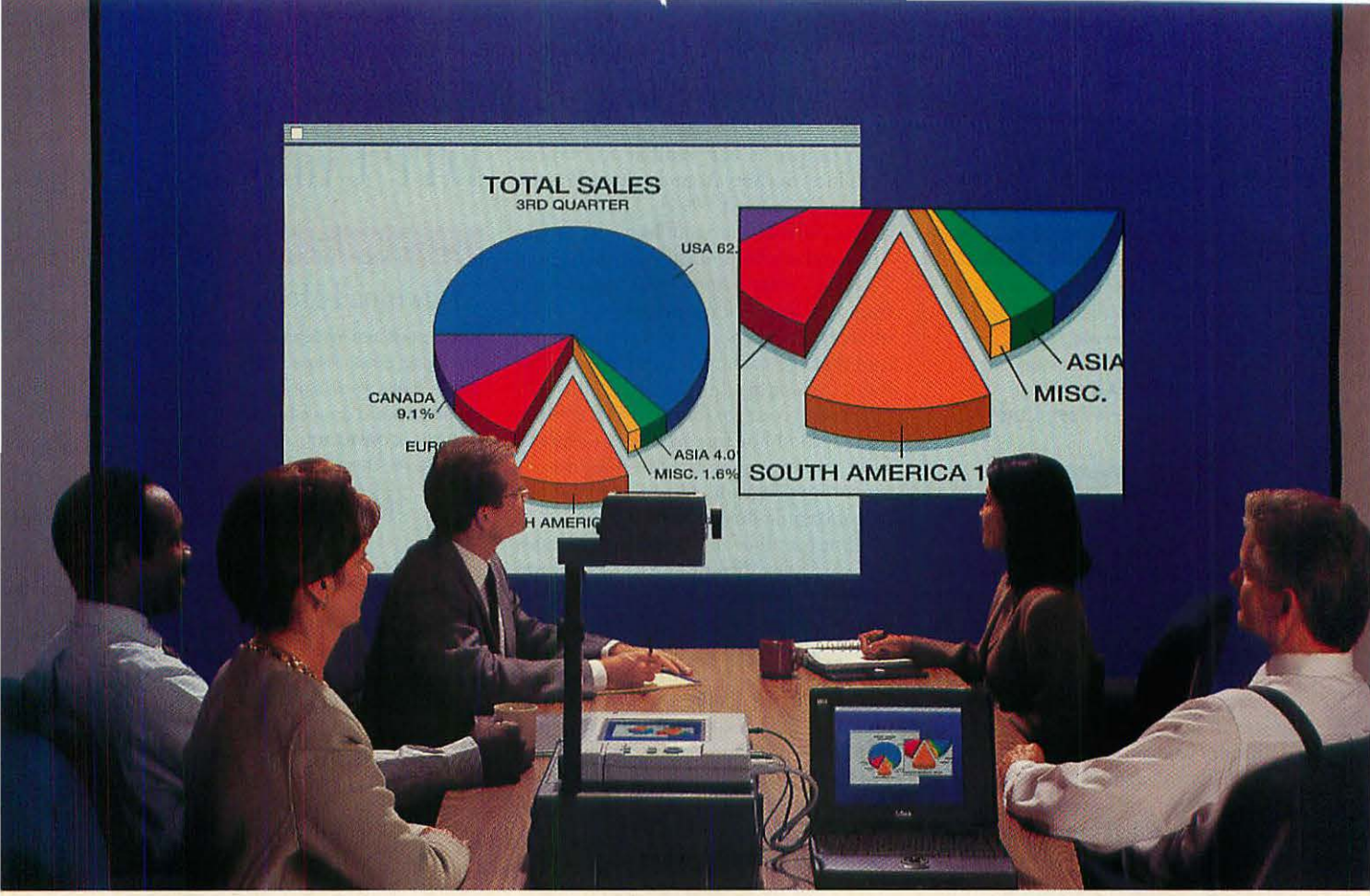
Two programs that offer these features are Download Mechanic and Let'er RIP. Both let you queue files for downloading, and both can download in the background so you can do other work at the same time, though not without "jerky cursor" syndrome. And both let you get info about your output device (resident fonts, PostScript version, and so on), reset it, and turn off the start-up page. There the similarities end.

Download Mechanic

Download Mechanic's strengths lie in its tools for dealing with problem files. It lets you view and edit PostScript text files, and it checks for fonts and resources required by and included in the file. It also provides an "outline" of the file—useful if you want to get into the code and find and/or fix problems. Most users, including service-bureau technicians, will probably regenerate the file instead.

In Test mode, Download Mechanic runs a file through the PostScript device without actually producing output—potentially saving expensive media. Another great, and apparently unique, feature is the ability to download selected pages within a PostScript file.

continues



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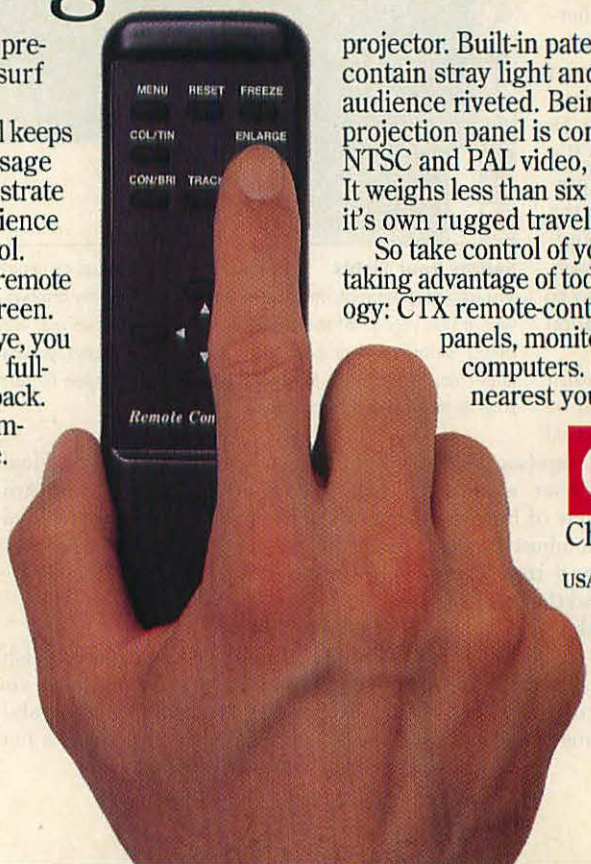

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Circle 38 on reader service card

Download Mechanic's error handler does a nice job of showing you the problem when a job doesn't print right. It prints the imaged page up to the point where the problem occurs, then provides a good report of the PostScript state at that moment.

Download Mechanic is not the best editing and debugging tool unless you've got RAM to burn. It can't edit files larger than its allocated memory, it opens large files very slowly (45 seconds to open a 500K file within 2MB of allocated memory, for instance), and it sometimes crashes when opening large files.

Download Mechanic is the fastest downloader I've used, however. My tests show that small files download in 72 percent of the time it takes with Let'er RIP; large files take 91 percent of the time. (Both programs are significantly faster than the free Apple and Adobe programs.) This makes it a great choice for occasional downloads, especially with smaller files.

Version 1.5, recently announced, promises improved performance when editing large files, an imagesetter proofing mode for laser printers, transverse printing, the ability to add files to a queue while downloading, and automatic downloading of fonts.

Let'er RIP

Let'er RIP provides a more flexible and fully featured downloading solution. It lets you set up a drop folder that it then monitors, downloading any file you put inside; you can also choose files to download using a normal Open dialog box.

Let'er RIP's intelligent handling of downloaded fonts and external resource files (such as linked high-resolution images in OPI or DCS files) is a joy. The program checks out what's needed in a file, finds it on your hard disk, and downloads it as necessary. It builds a list of the fonts on your printers and hard disks, so it usually doesn't have to perform lengthy searches. You can also attach headers and trailers to files automatically.

Add Let'er RIP's good support for Apple events—incoming and outgoing—plus the ability to page you if specific problems occur (assuming you have a compatible alphanumeric paging service and a modem), and you're looking at the basis of a full-blown service-bureau–management system.

The Last Word

Let'er RIP lacks Download Mechanic's debugging tools, and it's not as fast, but its flexibility, clean implementation, and attention to detail make it a pleasure to use. With almost identical prices, Let'er RIP is the one I'd choose.—STEVE ROTH

Two Maya Tools

Educational Software

MayaCalc 2.3.1

PROS: Wide variety of calendrical calculations and astronomical data. **CONS:** Display problems; poor manual and program design. **COMPANY:** Ecological Linguistics (202/546-5862). **LIST PRICE:** $120.

MW ★★★

Maya Hieroglyphic Fonts

PROS: Beautifully rendered glyphs. **CONS:** Character spacing sometimes uneven. **COMPANY:** Ecological Linguistics (202/546-5862). **LIST PRICE:** $10 to $60 per set.

MW ★★★★

MAYACALC ALLEVIATES MUCH OF the pain involved in working with the complex, multilayered Maya calendar. MayaCalc is a 4th Dimension front end and comes with a run-time version of 4D. The basic calendrical calculator contains two rows of text-entry boxes for Maya dates (Long Count and Calendar Round) and a shorter row in between for distance numbers. Enter a Long Count in either date row, and MayaCalc determines the corresponding Calendar Round for you. Enter numbers in any two of the three rows, and MayaCalc calculates the missing distance number or Long Count. For any date, the calculator displays the corresponding Lord of the Night, Lunar Series information, 819-day calendar data, and dates in the Julian and Gregorian calendars. MayaCalc handles Long Count dates and distance numbers containing Piktuns and Kalabtuns, as well as Prior Era dates (that is, prior to 3114 B.C., the beginning of the current Maya era).

Although it is easy in MayaCalc to calculate a sequence of dates separated by a series of distance numbers, only the last two dates in the sequence are visible; this is not as convenient as the six or seven dates and distance numbers that some PC calendrical calculators display. MayaCalc can calculate the possible Long Count dates for a given Calendar Round, but the procedure for calculating, viewing, and printing the list is unnecessarily cumbersome. A wide variety of commands (to add or subtract standard calendrical intervals, for example) can help you find the most likely possibilities for an incomplete date. MayaCalc also converts Julian dates back to Maya dates and factors distance numbers to determine if they are multiples of any sacred numbers or planetary or calendrical cycles.

MayaCalc calculates astronomical information for the selected date—including the positions of the moon and the five major planets—in absolute coordinates, elongation from the sun, geocentric longitude, and heliocentric latitude. (Look elsewhere, however, for accurate eclipse information.) It also draws customizable graphs of the moon and planets (as either elongations or latitudes) over a user-specified period of time.

In addition to MayaCalc, Ecological Linguistics offers Maya Hieroglyphic Fonts, a variety of fonts (in PostScript Type 1, Type 3, or TrueType format) based on Mesoamerican hieroglyphic scripts. The Maya fonts include beautifully rendered sets that duplicate well-known texts (see "Keyboard Glyphs"), as well as utilitarian fonts containing bar numbers, dot numbers, and Tzolk'in and Haab glyphs in either monument or codex styles. Each font set includes special keyboard software that allows you to, for example, specify glyphs from actual texts by typing their position (A1, A2, B1, and so on).

Keyboard Glyphs Many of the hieroglyphic fonts from Ecological Linguistics are based on well-known texts, such as Palenque's exquisite Tablet of the 96 Glyphs (shown here) and Yaxchilan's "king list" lintels.

The Last Word

MayaCalc's shortcuts are abundant but perplexing: some consist of a single letter key, others use command and letter keys, and still others are available only from a menu. The program has some display problems, and the manual's 20 laser-printed pages offer sketchy and sometimes confusing information. The general design of the program could also be improved. Because Maya glyphs often make for enormously complex characters, problems can occur when you print glyph fonts on lower-end printers. Unfortunately, the uneven character spacing in some font sets makes it impossible to align glyph columns in a word processor.

Altogether, however, these are minor quibbles. MayaCalc and the Maya font sets are highly useful tools for both serious and casual Mac Mayanists.

—ROBERT C. ECKHARDT

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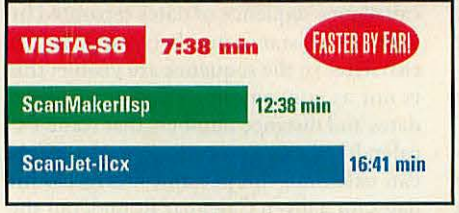

Letter size scan, 24 bit color, 300dpi, approx. 24MB image.
Equipment was Mac Centris 650, 24MB RAM, OS 7, Photoshop 2.5.1

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Macworld

Clue 1: Umax

MultiSpin 4Xe

Quad-Speed CD-ROM Player

PROS: Fast; can function as a stand-alone compact disc player; competitive price. **CONS:** The 50-pin high-density SCSI connector may complicate setup. **COMPANY:** NEC Technologies (708/860-9500). **COMPANY'S ESTIMATED PRICE:** $515.

MW ★★★★

MW LAB A SLEEK YET SOLID INDUSTRIAL design suggests the speed of NEC's MultiSpin 4Xe. This CD-ROM player is meant to be a desktop workhorse.

My tests confirm that it performs nearly twice as fast as Apple's CD300i for database-text searches, and it plays back movies with alacrity. Still, its performance varies by application. Few CD-ROM titles contain QuickTime movies optimized for speeds above 300 KBps, and most text-intensive CDs have index files that make complex searches fast even on a single-speed CD-ROM drive. However, the MultiSpin 4Xe significantly boosts the retrieval speed of most text-based information your company may distribute internally, particularly large databases and archives of unindexed text files. For most multimedia CDs, performance is slightly but not dramatically faster, so you spend less time waiting for screens and sounds to load.

The MultiSpin 4Xe also functions as a stand-alone compact disc player. NEC provides controls on the front panel for playing, changing tracks, and adjusting the volume (when using the mini-headphone jack). Oddly, the stop button also acts as a mode switch to allow repeat play of a CD. A backlit liquid crystal display shows the current track, mode, and other details, but it does not show the time remaining for either a song or the disc. NEC includes Casa Blanca Works' AudioCD to provide these features; however, when the software is active, these exterior control buttons (with the exception of volume) are disabled.

The 4Xe has both an inner door and a scooplike outer door to protect your discs from dust; the outer door doubles as the eject button. At first I thought the outer door would be clumsy and annoying. But it uses a latching mechanism that keeps it open when inserting or ejecting a disc, and closed while the drive is operating. At the rear of the long, heavy case, stereo RCA jacks like those on most stereo receivers provide an easy connection to a full-fledged sound system. NEC includes a video-out port for future video discs; no titles are available right now to take advantage of this feature, but when they are, you'll be ready.

A thumb-switch SCSI ID and termination DIP switch make configuration a snap, but NEC chose to equip the drive with a 50-pin high-density SCSI connector. The MultiSpin 4Xe comes with a cable that connects it to the Mac, but if you want to include the 4Xe with other drives in a SCSI chain, you may have to buy a SCSI cable that adapts a 50-pin high-density connector to a standard 50-pin Centronics SCSI cable—the type used by most Mac SCSI peripherals. (These cables are available from NEC.)

I was surprised to find that the MultiSpin 4Xe uses a CD caddy instead of a drawer for inserting discs. NEC says it chose this design to reduce the possibility of dust contamination and to allow the player to be operated on its side. While the case doesn't look like it *should* be placed on its side, I found that it worked fine that way.

In another unusual step, NEC chose to use Casa Blanca Works' software rather than its own brand-labeled floppy disks. Apart from slight confusion the unexpected software caused me, this choice presents no problems. Casa Blanca Works' DriveCD includes options for extra drive caches as well as utilities for mounting and gathering statistics on your discs.

RICHARD RETHEMEYER

The Last Word

Faster CD-ROM drives are clearly up and coming, and with its competitive price, free tech support, and two-year warranty, NEC's MultiSpin 4Xe is ready to race.

—TIM WARNER

Power Mac Update

Data Desk 4.2

System Requirements 680X0 Macintosh: 2MB of RAM, System 6.0.4. Power Macintosh: 4MB of RAM, System 7.1.2. Both require 1.1MB of hard drive space.
List Price $595; upgrade from 4.0 or 4.1 $45; upgrade from earlier versions $135 for registered users.
Company Data Description (607/257-1000).

Data Desk 4.2 ships with both native Power Mac and 680X0 versions on the same disk. It maintains the small 1.1MB footprint of previous versions by adding Power Mac code only for resource-intensive functions like vector calculations and graphic display. Data Description says that the PowerPC CPU doesn't speed non-FPU calculations such as categoricals, so the more categories your data set has, the less acceleration a Power Mac provides. A future release will accelerate non-FPU calculations on the Power Mac. There are no functional differences between the 680X0 and Power Mac versions of Data Desk 4.2.

Macworld Lab timed Data Desk as it calculated both the regression of a 50,000-case data set and the ANOVA of a 30,000-case set. We also timed a 360-degree rotation of a 3-D plot with 45,000 data points. We tested Data Desk on a Power Macintosh 7100/66 with 24MB of RAM and a 250MB hard drive. For comparison we ran the same tests on a Centris 650 with 16MB of RAM and a 230MB hard drive.

MW LAB Data Desk

	Regression	ANOVA	Rotate Plot
7100/66			
Native	5.2	4.2	5.6
Centris 650			
680X0	8.7	8.5	15.9

Average to perform tests (times in seconds).

The Power Mac release of Data Desk offers about twice the calculation speed of the 680X0 version. But Data Desk has always been a speedy performer. The real benefit of its Power Mac version is a nearly threefold speed improvement in manipulating complex graphics. Since Data Desk is primarily a tool for exploratory data analysis, this speed improvement means different views of your data are presented in almost real-time.

—JIM FEELEY

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Grammatik 6 for Macintosh

Grammar Checker

PROS: Inexpensive; improved interface; flags fewer bogus errors. **CONS:** Still misses real errors; can't directly open some recent word processor formats. **COMPANY:** WordPerfect Corporation (801/225-5000). **LIST PRICE:** $49.95.

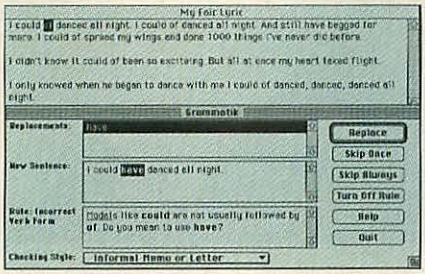
MW ★★★

GRAMMATIK 6 FOR MACINTOSH HAS benefited hugely from its programmers' efforts. The interface has been dramatically improved. Gone are the Chicago and Monaco fonts it used for your original text and the program's critique; it now clearly highlights proposed rewrites in context, through the tasteful use of boldface. There is also a pop-up menu of writing styles—Advertising, Fiction, Speech, and so on.

Grammatik opens most document formats: non-Fast-Saved Microsoft Word 3.0 through 5.1, FrameMaker 2.0 through 3.0, LetterPerfect 2.1, MacWrite II 1.0 through 1.5, Microsoft Works 1.1 through 3.0, WordPerfect 2.0 through 3.X, WordPerfect Works 1.2.X, and WriteNow 2.0 through 3.0—and text files, RTF files, and the Clipboard contents. (Note the omissions: ClarisWorks 2.0, WriteNow 4.0, and Word 6.0.)

Complete, example-rich explanations of Grammatik's suggestions are only a button-click away. The impressive new Parse Tree feature shows you a parts-of-speech analysis of any sentence; it somehow knows how to recognize even complex clauses.

Grammatik is also backed by a smarter brain. In my November 1993 column in *Macworld*, I subjected Grammatik 5 and its rivals to a torture test from the classic guide to good writing, *The Elements of Style* (Macmillan, 1972). In that shoot-out, a program earned a point for each correct diagnosis, and lost a point for each unflagged error—and for each bogus error it "found."



Typos and Grammos Grammatik's new interface shows your text in one window and its critiques (for spelling and grammar) in another.

Grammatik 5 had the worst score of all grammar checkers. It earned a –11 out of a possible 35. Correct Grammar (WordStar International) had the highest score—a +8. A live human editor scored +33.

Grammatik 6 also scored a +8, tying for first among the software editors. (The test and scores are posted on America Online and eWorld in the Macworld forum.) Most of the improvement came from eliminating bogus-error flagging. There are actual enhancements in this version, though: Grammatik now has a better eye for run-on sentences, and its improved parts-of-speech recognition catches misplaced or missing prepositions and bad punctuation. For example, the old Grammatik found nothing wrong with *My opinion is as good or better than his;* version 6 nailed the missing *as.*

The Last Word Grammatik first blows your mind by displaying what you swear is actual English comprehension. (Version 6 even suggests complete sentence rewrites, proposing *I will always remember my first visit* instead of *My first visit will always be remembered by me.*) Then it wrecks its credibility (by offering *Both clock strike* instead of *Both clocks strike*).

Still, Grammatik 6's low price, pleasant interface, and improved accuracy make it worthwhile for a large number of quality-driven writers.—DAVID POGUE

Survival Tools 1.0

Statistical Software Tool Kit for StatView

PROS: Templates very useful; includes most practical regression models and nonparametric stats. **CONS:** No Power Mac version yet. **COMPANY:** Abacus Concepts (510/540-1949). **LIST PRICE:** $295.

MW ★★★★

EVERY TIME YOU BUY INSURANCE, every time a doctor decides you need surgery, every time you read a product warranty, someone has performed a set of statistical tests called survival analysis. Abacus Concepts, recognizing this important but specialized activity, has produced Survival Tools, an add-on product for StatView.

The conceptual basis of survival analysis is simple. For a study of occupational hazards, you could take a set of twenty 30-year-old bush pilots in Alaska, twenty 30-year-old bike messengers in San Francisco, and twenty 30-year-old golf pros at suburban country clubs. As the years go by, you track "events" (meaning the death of a member of a set) and construct cumulative survival curves, with a time axis in years and a survival variable ranging from 1 (everyone in the group is alive) to 0 (they're all dead). Though this example is partially facetious, similar curves are used to decide if a particular cancer chemotherapy is useful.

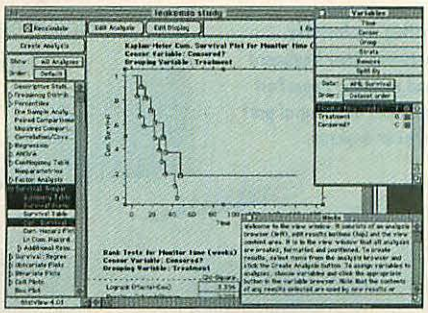
In StatView's unique mode of software organization, specific statistical operations can be added to the core menus. Survival Tools puts survival calculation in the StatView analysis menu. StatView also lets you save text, graphs, and tables as a single file called a View, and Abacus has prepared special Views as templates for routine or common statistical chores.

The Survival Tools package includes both Kaplan-Meier and actuarial estimates, linear-rank tests for survival, the Mantel-Cox log-rank test, and popular variations thereof. All of these tests are used to estimate the statistical significance of the results of your study. You can add other statistical tests to the same analysis View, and you have access to StatView graphics.

After looking at descriptive statistics for survival in any study, the next step is selecting and testing a regression model. In the most familiar kind of statistics, a regression model fits a straight line through a set of points where the analyst suspects a linear trend. In survival analysis, in contrast, the model fits a hypothetical survival curve of approximately the right shape (exponential, log-normal, proportional hazards, Cox, Weibull) to the points, allowing the analyst to speculate about the mechanism underlying the hazard process.

As always in StatView, regression models include plots, summary tables, and tables of residuals, which are automatically generated when the model and data set are chosen. Survival Tools is fast and convenient, and the exceptionally clear documentation and templates help you get started in survival analysis, even if you've had only a year or so of college statistics.

The Last Word The combination of survival analysis with the StatView template system gives you a virtual actuary-in-a-box. It's a great set of tools, conveniently packaged.—CHARLES SEITER



Hanging On A medical cumulative survival plot shows, basically, the length of time people with a certain condition survive (or avoid relapse) with and without treatment.

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macworld **Clue 1: PaperPort**

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RunShare

Network File Copy Accelerator

PROS: Transparent operation; accelerates both LAN and WAN file transfers. **CONS:** Significant acceleration only in certain file-copying situations; 800K memory overhead; intrusive copy protection. **COMPANY:** Run, Inc. (408/353-8423). **LIST PRICE:** LocalTalk version $199 for 6 users; all-network version $399 for 2 users to $2499 for 25 users.

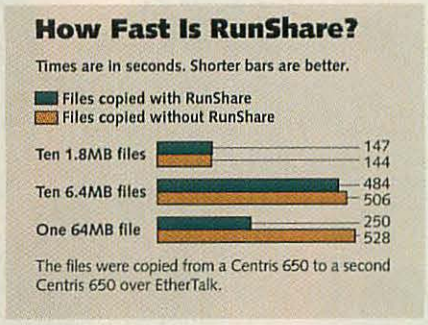
MW ★★★

NETWORK USERS ARE A FICKLE lot. Where once we marveled over effortless network file-sharing, we now grumble over slow performance. RunShare is a system extension that endeavors to pump up file-transfer speeds across both local and wide area networks. This it does, although not equally well for all networks.

The product package includes two floppy disks—an original and a backup—with an installer that copies the RunShare control panel to the System Folder. A concise yet complete manual guides you through the simple installation process and explains the straightforward operation, which boils down to turning RunShare on or off. When turned on, RunShare automatically accelerates Finder copies between any two RunShare-activated Macs. This task inflates your System memory usage by 800K.

The amount of acceleration varies depending on the direction of the copy operation. Tests showed very little throughput improvement when copying files from a remote machine onto a local machine, while copying files in the opposite direction showed at least double the throughput. Run, Inc., says this is normal. CPU and network speeds also affect the amount of speedup. While there was almost no improvement using RunShare on 68030-based Macs over LocalTalk, there was a threefold improvement on 68040s over EtherTalk. RunShare accelerates copying only the data portion of Mac files, so copying application programs, which are mostly composed of resource objects, is no faster. I saw the best speedup on files 10MB or larger.

You buy a RunShare license for every user who needs the acceleration. A low-end version of the product, for LocalTalk networks only, comes in a six-user package. The high-end, all-network version, which supports EtherTalk, TokenTalk, and FDDITalk (Fiber Distributed Data Interface), comes in 2-, 5-, and 25-user packages. Each package contains only two floppy disks, and you must manually install the program on each machine. RunShare's installer keeps count of the times the program has been installed; once you reach the licensed-user count, it will not install more copies. If you later want to move RunShare from one machine to another, you must first run the installer's deinstall mode on the first Mac.



The Last Word RunShare's high overhead and minimal speed improvement on low-end Macs makes it impractical for many smaller networks. And RunShare's copy protection is guaranteed to drive network administrators up the wall; a run-time serial-number check would be just as effective and much less intrusive.

Still, with twofold to threefold throughput gains on fast Macs, RunShare will be a winner with desktop publishers, who frequently spend hours copying large files across networks.—MEL BECKMAN

VIP-C 1.5

Programming Utility

PROS: Slick links to all major compilers; transparent Power Mac development. **CONS:** Hybrid graphical and text programming style occasionally awkward. **COMPANY:** Mainstay (805/484-9400). **LIST PRICE:** $495.

MW ★★★★

WHEN YOU BUY A MAC PROgram that takes 1.5MB of RAM (not a big application, these days), it means that someone, somewhere, typed up several megabytes of code, about the equivalent of a 1500-page book. For a standard Mac program the bulk of that code is repetitive calls to Toolbox routines and tedious windows-plus-menus setups. VIP-C saves time by offering the most useful standard code fragments in a semivisual programming environment.

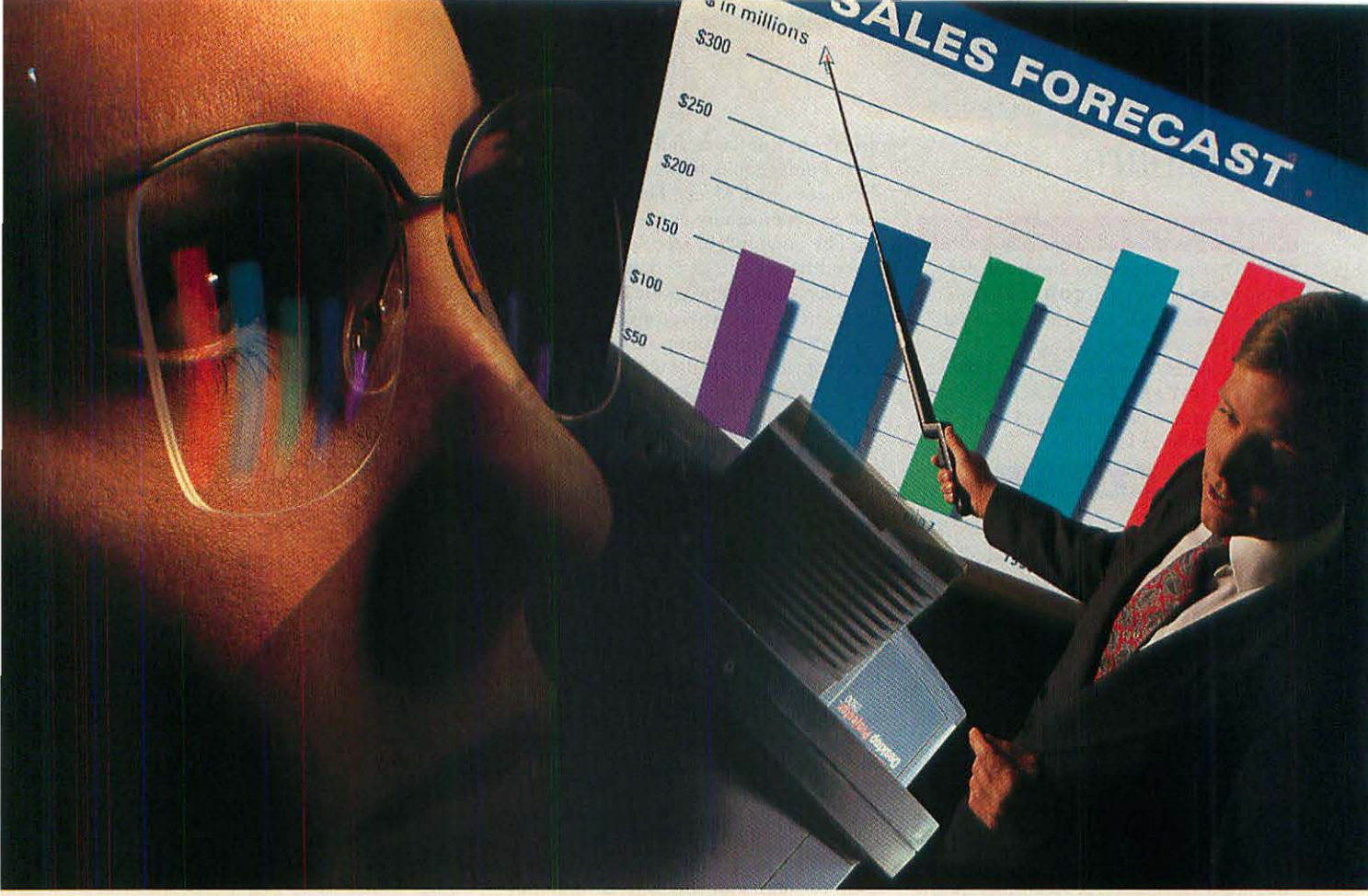
VIP-C isn't an exclusively iconic programming system like ProGraph CPX, in which code has been replaced by diagrams. In VIP-C, you can work with a library of icons that stand for program elements, but as soon as you use them in a programming diagram, C language code also appears as text in its own window. If you are used to typing everything in a code editor, this is reassuring; for beginners, this hybrid presentation is sometimes confusing.

Nonetheless, VIP-C saves lots of application-development time, first because it anticipates most of the boilerplate code in a Mac app, and second because you can't generate bugs by typos in VIP-C (the canned code has already been proofread). VIP-C has engendered a respectable list of commercial applications, and it's a favorite for in-house development. Old VIP-C code can be opened in VIP-C 1.5, sent directly to a Power Mac compiler, and recompiled as a native Power Mac program. You can still use your favorite C++ compiler, while VIP-C anticipates and dodges code-conversion problems for you. The version 1.5 rework required Mainstay to shuffle some libraries and modify some data types (Power Macs have a 128-bit rather than 80-bit floating-point numerical type, for example), as well as change the way the program generates stand-alone run-time applications. But Mainstay has made the new environment as familiar as possible; to install VIP-C, you just follow a few simple directions in the Setup file for your compiler.

VIP-C 1.5 accepts the realities of Power Mac development, giving Metrowerks CodeWarrior the most support. MPW support in VIP-C 1.5 is also good, while Symantec compiler fans can look forward to a series of 1.5.X version tweaks as Symantec's own Power Mac efforts finally solidify. I'm happy to report that a small (100K) statistical application I wrote in VIP-C 1.0 as a test project for a previous review is now running merrily on a 6100, and converting it for the Power Mac took only part of an afternoon with the VIP-C 1.5/CodeWarrior Gold combination.

Ready When You Are VIP-C 1.5 automates the process of running 680X0 code on a Power Mac.

The Last Word For convenience in producing 680X0/Power Macintosh applications, VIP-C 1.5 is a fine investment. Intermediate-to-advanced programmers will get the most benefit, but even beginners will find that VIP-C helps turn their student projects into serious apps.
—CHARLES SEITER



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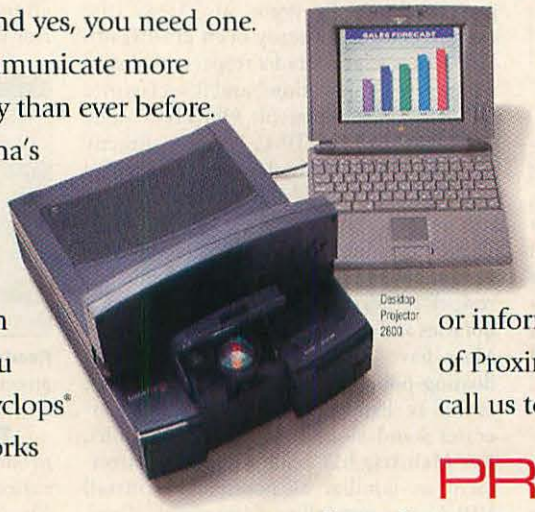

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TextureScape 1.5

PostScript Texture Generator

PROS: Resolution independent; automatically arranges patterns for seamless repeatability; space-efficient file format. **CONS:** None. **COMPANY:** Specular International (413/253-3100). **LIST PRICE:** $195.

MW ★★★★

TEXTURESCAPE IS A COMpletely new type of algorithmic art program that lets you manipulate and arrange PostScript shapes to create seamlessly repeating patterns. Version 1.5 is Power Mac native. (Upgrades from version 1.0 cost $29.)

To begin a TextureScape pattern, you first draw a simple shape in a PostScript draw program, such as Adobe Illustrator. Once you've imported the shape into TextureScape, you can resize, rotate, or scale it, using as many shapes as you like to create a pattern. Each shape resides in its own layer, and you can manipulate them separately.

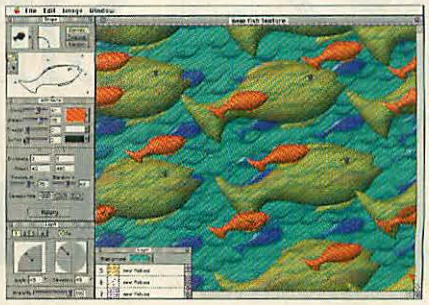
TextureScape is far more sophisticated than the simple desktop-pattern makers most of us have seen, which tend to produce rigid, uninteresting designs. With TextureScape, the basic building block of your pattern is a repeating cell. Within the cell, you can set a value for the number of times each shape repeats vertically and horizontally. You can also set separate horizontal and vertical values to determine how random the placement of the shapes will be.

Together these features produce patterns of complex and subtle symmetry. Remarkably, no matter what settings you use, TextureScape can repeat the pattern endlessly without discontinuities, or seams.

Pseudo–3-D features add depth to TextureScape designs. You can specify a bevel style for any shape, and determine whether the object will appear convex or concave (you can even mix things up by having the object vary randomly from convex to concave). You determine the placement and angle of lights in relation to objects, and you set the degree of gloss for any object.

TextureScape offers controls that allow you to create subtle, amorphous shapes and shadows. By adjusting Bumps (which produce a granular, airbrushed look), Transparency, and Softness, you can simulate anything from clouds to sponge daubs.

The Last Word TextureScape's ability to create repeatable patterns makes it perfect for 3-D artists who want to create seamless texture maps. The fact that the program can generate very large bitmaps from very small PostScript-description files will make it attractive to print designers.



Variations on a Theme By changing the parameters in the dialog boxes, you can create an infinite number of patterns from a few basic shapes.

Although you can use TextureScape to produce realistic surface textures, such as wood or stone, don't throw out your scanned-texture CD-ROM just yet. Designing anything that looks convincing takes considerable trial and error.

The ideal algorithmic art tool should be simple enough to be fun but flexible enough to give you meaningful control. By this standard, TextureScape is a success. With it, artists and nonartists alike can consistently share the oddly exhilarating experience of creating pictures that—because they partake equally of design and serendipity—look like what you had in mind, only better.—JOE MATAZZONI

Autoscore 1.0

Music-Recognition Software

PROS: Amazing technology; practical and convenient. **CONS:** Inaccurate if microphone, software, or singer isn't ideal; works with only some music programs. **COMPANY:** Wildcat Canyon Software (510/527-5155). **LIST PRICE:** $150.

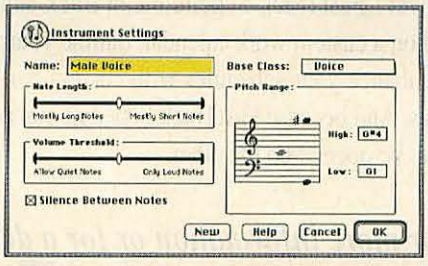
MW ★★★

THE NEWTON INTRODUCED HANDwriting recognition. The Quadra AVs attempted speech recognition. Now musicians can have pitch recognition—you sing, and the Mac knows what note you're hitting. It's more accurate than those handwriting or speech technologies; but like them, its success depends on the conditions.

Autoscore, which is all software, does nothing by itself. It's merely a conduit for the single-line melodies that you sing or play using an acoustic instrument, say a clarinet, trumpet, or guitar. Autoscore converts the sounds it hears from your microphone into MIDI (digital music) data, which it passes on to your other music programs.

For example, Autoscore is a natural partner for Ars Nova Software's Practica Musica (see *Reviews*, January 1995), letting you sing your responses to Practica's quizzes instead of using the mouse. Autoscore also works well with notation programs, such as Temporal Acuity Products' Nightingale and Coda Music Technology's Finale and Finale Allegro. Using these programs, you can crank out single-line melodies quickly, humming to indicate pitch, and tapping number keys to specify quarter note, half note, and so on.

In sequencer (music-recording) programs, such as OSC's Metro 2.5 and Opcode Systems' Vision 1.43 and earlier, you can record unique special effects. If you turn off the Autoscore feature that cleans up your pitch inaccuracies, you can slide from one note to another as you sing. Your sequencer will record a pitch bend, which you can then play back using any MIDI synthesizer's built-in sounds.



Autoscore's Voices To aid Autoscore's speed and recognition, you can teach it about your voice. In this dialog box, you specify how loud, fast, high, and low you'll be singing.

At this writing, the only other programs Autoscore works with are Ars Nova's Songworks 1.6, Jump Software's ConcertWare 1.5, and Opcode's Musicshop. The company is enhancing Autoscore to be compatible with other programs, such as Mark of the Unicorn's Vision 2.0 and Performer.

Once Autoscore is working, it works well. However, setting it up may take some effort. For example, the Mac microphones built into PowerBooks and the AudioVision monitor pick up too much hum, which throws off Autoscore's accuracy. You'll have the best luck using, say, a $15 Radio Shack microphone—or even singing into a pair of Walkman-type headphones. And if your model doesn't have a microphone jack (most Mac II's and the SE/30), you'll have to buy a MacRecorder ($99, from MacroMedia) to use Autoscore. One other point: you don't have to be a good singer to use Autoscore—indeed, a professional-sounding vibrato actually hurts its accuracy—but you do have to stay somewhat on pitch.

The Last Word Converting the imprecise pitches of the human voice into the concrete, black-and-white of MIDI note information is a challenging feat. If you have the right music software, the right mike, and the right voice, Autoscore can actually pull it off.—DAVID POGUE

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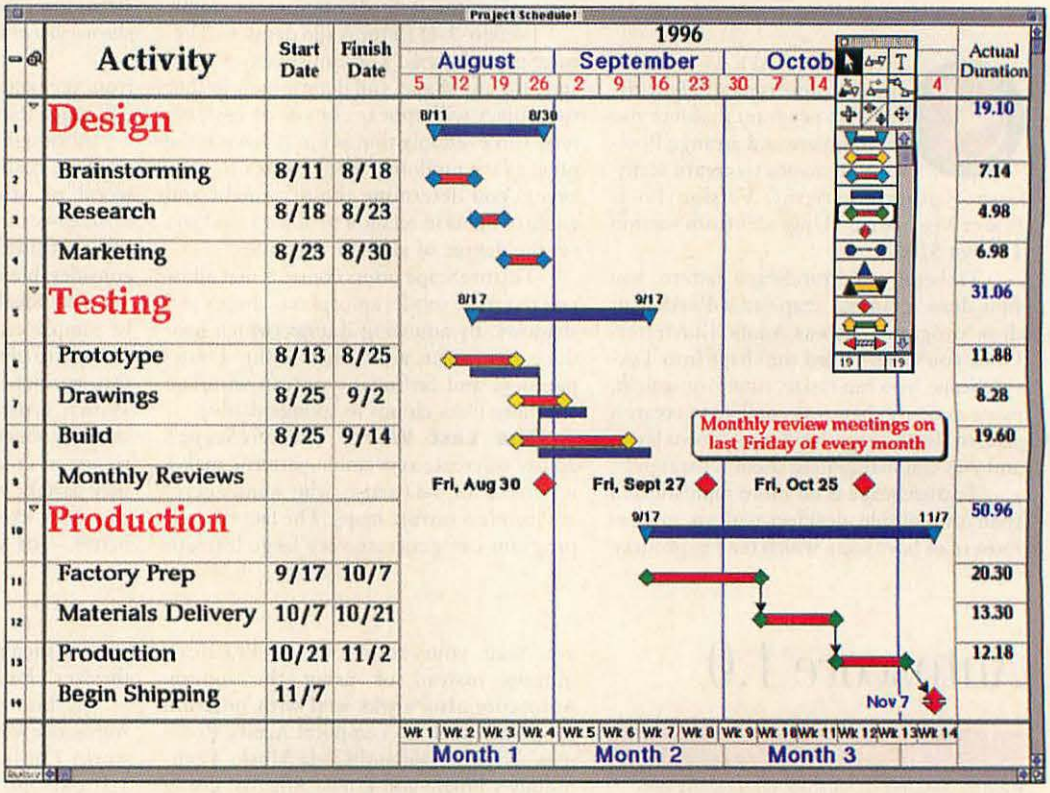

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Pixar Typestry 2.1

3-D Type-Effects Software

PROS: Supports QuickDraw GX and TrueType GX fonts; renderer runs in native mode on Power Macs. **CONS:** Access to bold, italic, and bold italic variants of non-GX fonts requires separate screen fonts for those styles. **COMPANY:** Pixar (510/236-4000). **LIST PRICE:** $299.

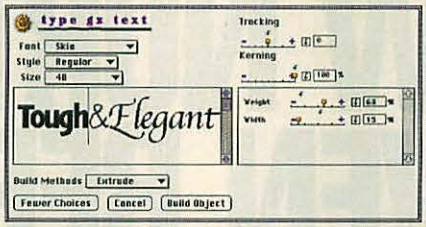
MW ★★★★

PIXAR'S TYPESTRY 2.0 HAS long been my favorite 3-D type-effects program, with its approachable interface, a strong array of animation features, and outstanding image quality (see *Reviews*, *Macworld*, June 1994).

Typestry 2.1 supports the enhanced features of System 7.5's QuickDraw GX. It uses the standard GX Page Setup and Print dialog boxes, which provide more control over print jobs than do their non-GX counterparts. More significant, Typestry 2.1 is one of the first programs to support the fantastic flexibility of TrueType GX fonts, from automatic character substitution (for example, substituting a real fraction when you type **1/2**) to ductility (the ability to adjust character boldness and width in continuous increments). (For a primer on GX font technology, see "Inside QuickDraw GX Fonts," *Macworld*, October 1994.) And best of all for Power Mac owners, Typestry 2.1 runs in native mode on Power Macs, allowing you to see your 3-D masterpieces far faster than you can on 680X0 Macs.

A new text tool provides the gateway to Typestry's GX font support. It displays a dialog box in which you can type the text that you want to build into a 3-D object. A pop-up Style menu lets you access the special features built into a given GX font. If you've chosen a font that provides built-in tracking, kerning, and weight-adjustment features, additional sliders appear that let you tweak those values. You can also type numeric values for precise adjustments.

Typestry 2.1 can even import and create 3-D versions of portable digital document (PDD) files created using QuickDraw GX's PDD Maker driver. In theory, this lets you create 3-D text or line art from any document, but because of the way many programs create PDD files, you often end up with extraneous boxes and weird artifacts. It's easier to create 3-D line art by drawing in Adobe Illustrator and then importing the Illustrator file into Typestry.



GX in 3-D Typestry 2.1 gives you full control over the special capabilities of GX fonts. With a ductile font such as Skia, you get sliders that let you adjust the weight and width of characters.

Typestry 2.1 running in Power Mac–native mode really cooks. An image that rendered in 13.5 minutes on a Quadra 840AV rendered in less than 2 minutes on a Power Mac 7100/66—more than seven times as fast. With rendering performance like this, you have more time to experiment with effects, lighting, and surface textures. And you can make a QuickTime movie during lunch instead of over the weekend.

The Last Word If you've upgraded to System 7.5 but haven't installed QuickDraw GX, Typestry 2.1 may make you dig out your installation disks again. If you've been working with Typestry 2.0 on a 680X0 Mac, Typestry 2.1 is a great excuse to upgrade to a Power Mac. And if you haven't yet entered the world of 3-D type—and you have a relatively fast Mac with at least 8MB of RAM and a math coprocessor—give Typestry 2.1 a try. It adds a new dimension to the way you look at type.
—JIM HEID

Kaboom 3.0

Sound-Effects Utility

PROS: Included sounds are of high quality; easy to install and edit sounds. **CONS:** Some features are available as shareware; sounds may annoy your coworkers. **COMPANY:** Nova Development Corporation (818/591-9600). **LIST PRICE:** $49.95.

MW ★★★★

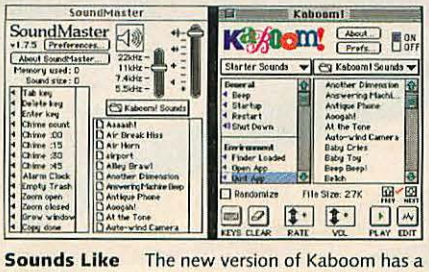
THERE'S AN OLD ADAGE THAT SAYS it's OK to talk to yourself as long as you don't answer back. Fortunately, Kaboom 3.0 talks back *for* you. Kaboom lets you assign sounds to Mac events (like shutting down or emptying the Trash) at hourly intervals or with a keystroke. Kaboom comes with 154 sounds—ranging from honking horns, to a squawking parrot, to crying babies, to Lucille Ball saying, "Oh now, Ricky!"

Earlier Kaboom versions consisted of a commercial version of shareware called SoundMaster ($15), by Bruce Tomlin, plus a set of sounds. Nova Development says Kaboom 3.0 has been rewritten and supports more events, longer sounds, and sound sets, and has better memory management plus a new sound editor.

The new Kaboom control panel organizes events into categories such as General, Disks, and PowerBook. The PowerBook events are possibly the most useful: you can make Kaboom beep when your battery needs charging or when you remove the power cord from your PowerBook.

The sounds included with Kaboom range in both type and tastefulness; personally, I would not configure Kaboom to sound a pistol shot at start-up or a prostitute saying, "Come here, cutie, hey" when my Macintosh needs a disk. Fortunately, you can configure Kaboom easily and delete the files that you don't want. Kaboom accepts most sound formats (System 7 SND resources, AIFF, Macintosh sound files, and sound suitcases), so you can use your own sounds as well.

You can also adjust the frequency and volume at which a sound plays, and you can play random sounds at specified events. Sound sets let you create groups of sounds: perhaps a calming set for the adult in your house, and a set of belches, screeching chimps, and Really Gross Spit for teenagers. You can stop a sound in the middle of playback by pressing the escape key.



Sounds Like The new version of Kaboom has a redesigned interface, but it's still fairly similar to its predecessor and shareware cousin, SoundMaster.

You launch the sound-editing application, Kaboom Factory, either at the Finder or by clicking on Edit in the Kaboom control panel. Within Factory, you can add sound effects and copy and paste between sound files. The files can get fairly large, but Kaboom has a compression option in its Save As dialog box that reduces file sizes by three times or six times. When editing a sound in Kaboom Factory, you can select a portion of the sound just as you would select a word in a word processor. You can apply effects like Amplify, Reverb, and Echo to a particular sound or part of a sound. Kaboom Factory also lets you change the scale, volume, and pitch of a sound. It's a fun, well-designed tool for novice sound editors.

The Last Word With a street price of about $35, Kaboom costs more than twice as much as SoundMaster, but the latter doesn't come with sounds or a sound editor. Kaboom's upbeat and clearly written manual is also an asset. Kaboom is a fun program for anyone who wants a little company while computing.—JOANNA PEARLSTEIN

There is nothing like the feeling of losing your data. There is nothing like booting up to find that your twenty-page conference report has burned to a crisp. Or watching a month's worth of virus-infected spreadsheets go up in smoke right before your eyes.

When it happens, a rush of job-security panic begins in your legs and rapidly bolts all the way up to your cerebellum. And the impact of losing all of your hard work affects you in a way you'll certainly never forget.

Data loss. It's one fiery disaster that makes for an awfully bad day.

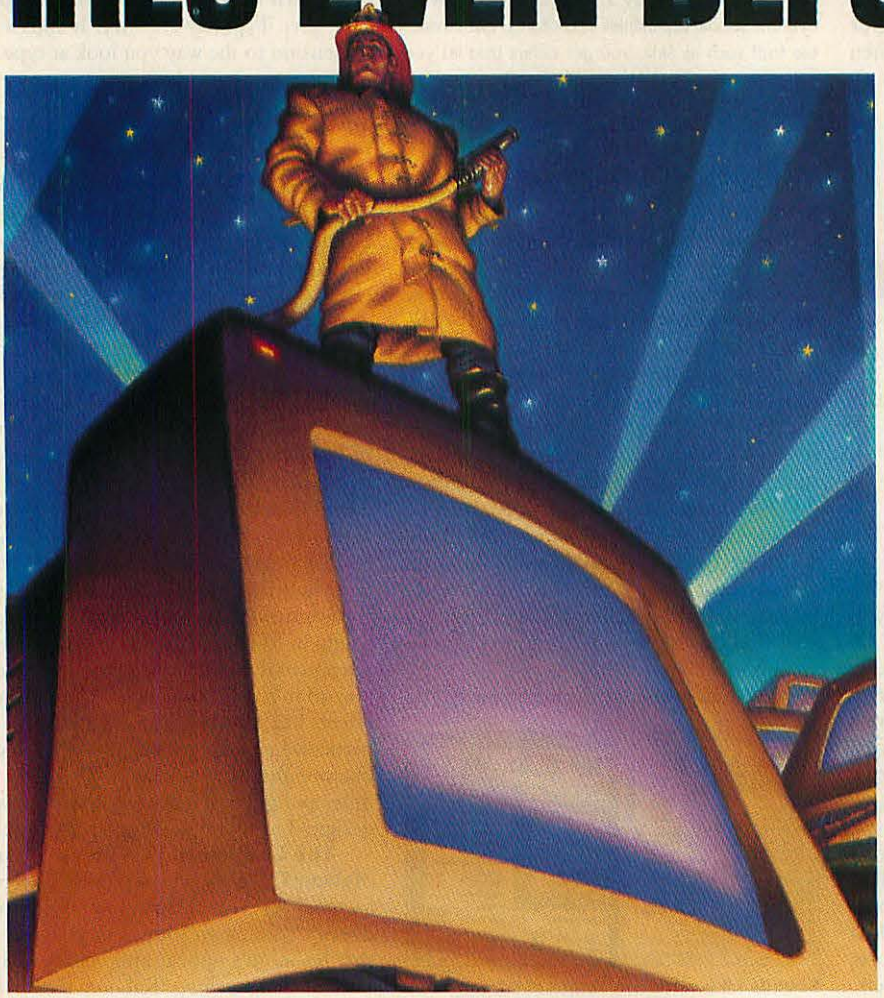
Proactive Protection For Your Macintosh.

This being the way things are, at Symantec we subscribe to the theory that the best way to deal with a disaster is, well, to prevent it in the first place. Which is the very reason for our newly updated Norton Utilities® and SAM.® In a word, they're proactive. But to put it more poetically, this improved data-protection software actually snuffs out fires without so much as the stirring of your mouse.

New Norton Utilities Detects Damage Before Disasters Happen.

For starters, look at our new Norton Utilities 3.1. We've taken the industry's most powerful data recovery and repair program and improved it to where it's almost invisible. So that now you can virtually load it and forget it.

NEW NORTON AND FIRES EVEN BEFORE YOU



The new versions of Norton Utilities and SAM provide proactive protection. Kind of like little firemen running around behind the scenes stamping out fires before they can ever start. So, even if it could've been a ten alarmer, you'll never hear a thing.

The enhanced Filesaver feature proactively and consistently works to maintain your system at premium health by scanning in the background for early signs of trouble. This new agent-oriented technology is a Norton exclusive that personally reminds you when it's time to do basic data maintenance such as backing up or optimizing. In terms you can easily understand. It also automatically monitors your data for up to 500 deleted files so they can be easily recovered.

Once a problem has been detected, Norton Disk Doctor takes over. Improved Disk Doctor recommends a solution and then executes it on your command. It now hunts down, diagnoses, and repairs problems in more areas of the disk than any other software.

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The enhanced Speed Disk's unique customization feature lets you defragment everything from a whole volume to a selected file.

And Norton Utilities 3.1 now also includes enhanced backup. Which creates self-extracting and self-restoring backups of your data.

This improved capability makes it even easier for you to restore data during emergency situations. And our backup now also supports tape drives.

Peter Norton has always been well ahead of the pack when it comes to desktop data recovery and antivirus protection software.

greatest level of protection against new viruses as they are discovered.

The new SAM also scans for and destroys viruses in more types of compressed files than any other antivirus software can. SAM covers DiskDoubler, Compact Pro, StuffIt, and Now Compress. This ensures your ability to detect and eliminate a virus in any compressed file.

And for all of you who have a healthy appreciation for speed, the means accelerated scanning speed, greater productivity, along with even more transparent protection.

What it shakes out into is that improved Norton 3.1 and SAM 4.0 now provide your Mac with the ultimate available levels of proactive protection against data loss. It's all rather amazing.

Then again, maybe all of these advancements are not so amazing. After all, Symantec is, of course, the proven industry leader when it comes to Mac data repair and recovery and virus protection.

SAM. THEY PUT OUT CAN SMELL THE SMOKE.

NEW SAM PROVIDES THE BEST PROTECTION AGAINST VIRUSES.

However, that's just the half of this proactive pair. We've also fully redesigned SAM 4.0 to provide the most complete and most effective virus protection, detection, and elimination of known and unknown viruses. So that what could turn your entire system into a towering inferno never even becomes a spark.

Accelerated for Power Macintosh

Norton and SAM are accelerated for Power Mac, letting users take full advantage of the speed capability this technology provides.

One of SAM's exclusive features is automatic virus updating. Through your modem, SAM automatically dials the Symantec BBS daily, weekly, or according to any schedule you tell it to follow.

It then downloads the latest virus antidotes and updates your virus definition files. So you now no longer have to mess with manual updating. This assures you have the improved SAM is also the faster SAM. The 4.0 version scans for viruses significantly faster than its predecessor. Which makes virus protection more seamless and less disruptive to your work flow.

Want more? Okay, SAM is also the only virus protection software that allows you to create a custom decontamination disk specific to your machine. This lets you reboot your Mac easily should your system crash from a virus.

The 4.0 version also simplifies the user interface by combining SAM Intercept and Virus Clinic into one easy-to-use component. This advancement allows you to configure more expert options from one convenient location.

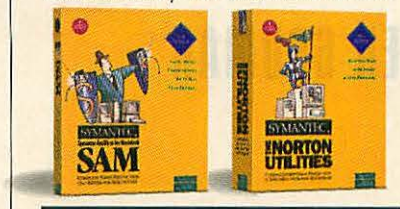
POWER MAC NATIVE.

While these new versions will protect your original Mac, they are also Power Mac native. So those of you with a Power Macintosh can take full advantage of the increased processing power. Ultimately, that

So, pick up the entirely new versions of Norton Utilities and SAM. And then, if you smell something burning at the office, you'll know it's either yesterday's coffee or that guy two cubes upwind who's trying to put out his fiery data disaster. That you well know could have been prevented in the first place.

CALL 1-800-628-4777.

To keep data loss from casting a glow on the office landscape, call 1-800-628-4777, ext. 9FF3. If you own Norton Utilities and SAM, you can order upgrades for $39.95 and $29.95 respectively.* Or you can purchase the new versions at your software store.



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Making the Move to Power

Macworld's best strategies for an affordable, powerful upgrade

MW LAB

BY GALEN GRUMAN

Now that most major applications are available in native Power Macintosh versions, your Quadra or Centris—or even your accelerated IIci—is starting to look mighty slow. Apple's Power Macs are fairly inexpensive, and there are several Power Mac upgrade options available, too. But there are even cheaper 040-based accelerators and CPU boosters. So what should you do?

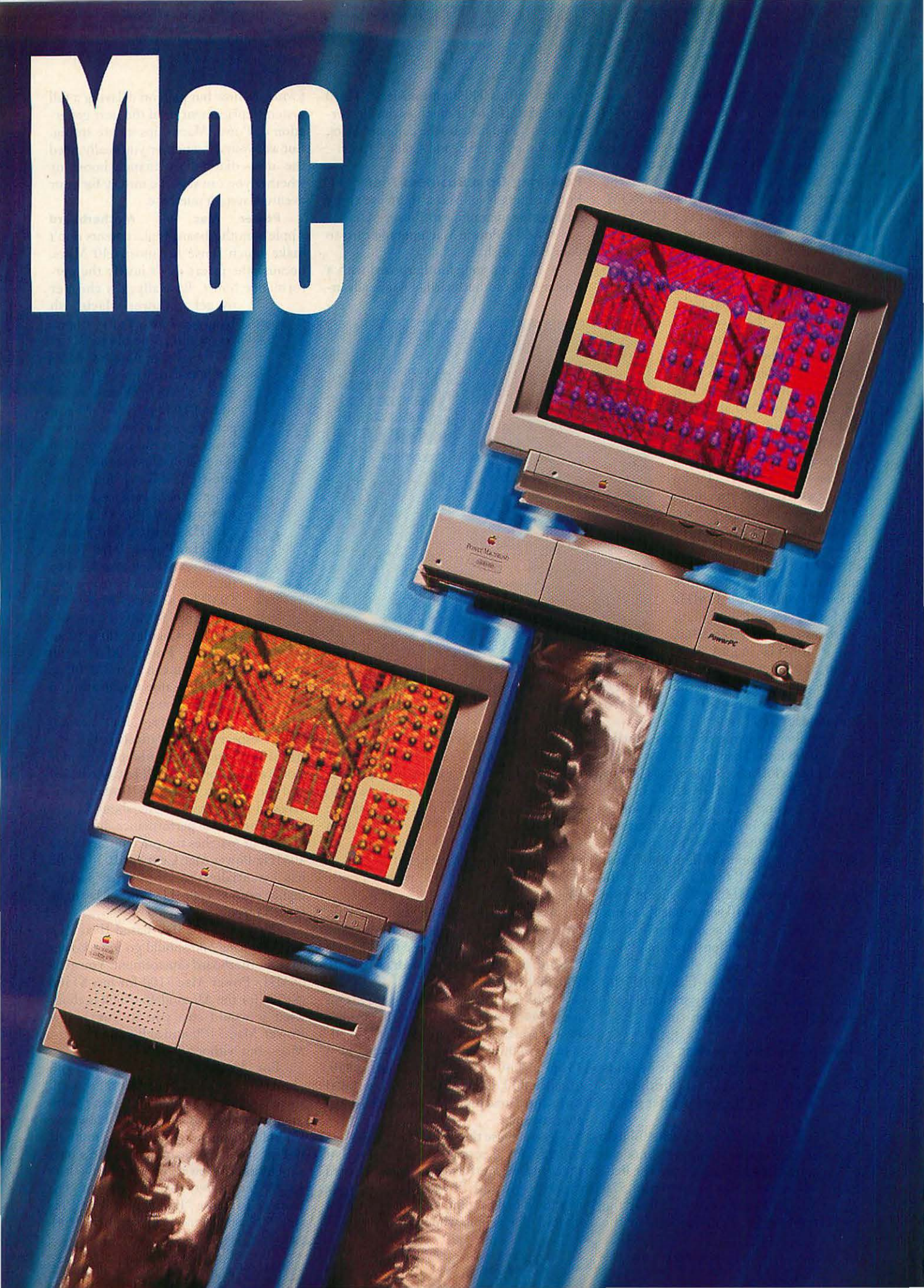
In a nutshell, abandon any Mac in the 68040 line (or any other 680X0-based Mac) and move up to Power Mac. You will have to do it eventually, since Apple's Macintosh future is Power Macintosh only. Expect the 040 models to stop coming by the end of 1995.

Bye-bye, Accelerators

It's no accident that the Mac accelerator market has all but dried up: Applied Engineering, Dove Computer Corporation, Fusion Data Systems, Harris International, Impulse Technology (now a part of the networking company Spectra Systems Corporation), Novy Systems, and Total Systems have stopped selling accelerators; DayStar Digital has cut about half its staff; Logica Research (renamed PowerLogic) and TechWorks are now focusing on cache cards; Radius is focusing its Rocket line on multiprocessing, something that just a few types of users might benefit from, including those doing 3-D rendering; and DiiMo Systems, Extreme Systems, NewLife Systems, and Brainstorm Products are focusing on inexpensive (about $200) upgrades for various obsolete Macs.

The only growth seems to be in the area of CPU boosters, a type of upgrade that makes a Mac work faster than it is designed to (see "CPU Boosters," *Macworld*, March 1994). Two companies—KS Labs (614/374-5665) and Newer Technology (316/685-4904)—sell these types of upgrades for Power Macs, and these two companies plus Mobius Technologies (510/654-0556) and Sonnet Technologies (714/261-2800) sell similar boosters for 680X0 Macs. Though neither endorsed nor rejected by Apple, CPU boosters are effective, inexpensive solutions for a moderate performance boost, according to Macworld Lab testing (see the sidebar, "Even Faster Power Macs").

PHOTOGRAPHS BY PAUL FRANZ-MOORE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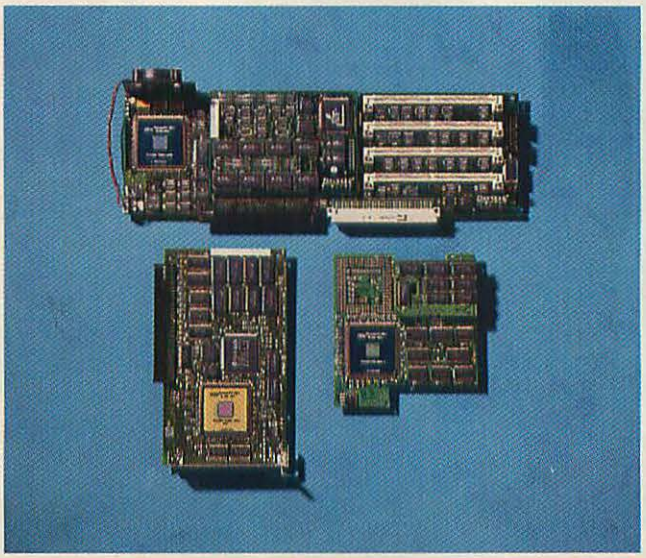
The acceleration market has collapsed for a simple reason: Apple sells new, fast Macs for just a few hundred dollars more than what an accelerator card would cost. And accelerator makers can't really do anything about it, because the newest Macs use a new CPU and ROM. Vendors can buy PowerPC CPUs from IBM or Motorola for use in an accelerator, but they can't buy the Mac ROM.

Apple has licensed the ROM only to DayStar and only for upgrades for a few Macintosh models (such as the Quadras and the IIci). And DayStar has no PowerPC upgrade for the IIci, and neither does Apple. So in such cases you might conclude that an inexpensive 040 accelerator is still a good idea.

You can get cheap 68040 accelerators from DayStar and others—the 33MHz Turbo 040i (which has no math coprocessor) from DayStar, for example, costs $599 for the IIci—a lot less than a DayStar PowerPro 601 PowerPC accelerator for a Quadra (about $1700). But a 33MHz card that includes a math coprocessor costs about $860, and a 40MHz model costs about $1050 (street price)—you're fast approaching the price of a Quadra 630 or Power Mac 6100.



Power Mac Upgrade Cards Clockwise from the top, the DayStar Digital 80MHz PowerPro 601 with FastCache, the Power Macintosh Upgrade Card for Entry-Level Macintosh, and the Power Macintosh Upgrade Card.

Megahertz for megahertz, a PowerPC is much faster than an 040. For example, Macworld Lab compared a Centris 610 (which has a 20MHz 040) with the same Mac using a Sonnet Technologies Centris Booster (a 40MHz 040 accelerator) and with the same Mac using an Apple Power Macintosh Upgrade Card (which runs at 40MHz on a Centris 610). Overall, the 40MHz 040 accelerator made the Centris 610 run about 1.7 times as fast—that's good for a product with a direct price of $399. But the Apple PowerPC card, which costs about $600 via mail order, ran twice as fast. With the small price difference, why settle for anything but PowerPC performance?

The Road to Power Mac

The path you take to Power Mac depends on where you're starting. I divide the Mac lineup into five segments and offer strategies for each.

The first segment is the 68040 business Mac: the Centris and Quadra models. Second is the 040 consumer Mac: the Performa 470 series, the LC 470 and 570 series, and the Quadra 605. (I classify the Performa and LC 630, variants of the Quadra 630, as 040 business Macs.) Third is the Mac II line. Fourth is the PowerBook line. And fifth are the compact Macs, such as the Plus, SE, and Color Classic.

Powering Up a Business Mac

For business-level Macs, there are three options for upgrading to Power Mac:

- Add a Power Mac upgrade card to your Macintosh.
- Replace your motherboard with a Power Mac motherboard. To take advantage of this option, you must have a Centris 610 or 660AV or Quadra 610 or 660AV (which can be made into a Power Mac 6100); a IIvi, IIvx, Performa 600, Centris 650, or Quadra 650 (which can be made into a Power Mac 7100); or a Quadra 800 or 840AV (which can be made into a Power Mac 8100).
- Replace your Mac with a Power Macintosh.

Accelerate to Power Mac Today, Power Mac cards are available from Apple and/or DayStar Digital for the Centris 610 and 650 and for the Quadra 610, 650, 700, 800, 900, and 950.

Which option you select depends on what Mac you're starting with. Apple's Power Macintosh Upgrade Card, available for $600 to $700, is the best bet for a 33MHz 040 Mac (the Quadra 650, Quadra 800, and Quadra 950), since it turns those machines into 66MHz Power Macintoshes.

You can use the Apple card in 20MHz and 25MHz Centrises and Quadras, but then you get performance below that of even the slowest Power Mac. A Power Mac card makes some sense as an interim upgrade for people who want better performance now but plan on delaying a full system replacement until the next generation of Power Macs ships in late spring. But ask yourself whether you really need the immediate performance boost or whether you can save the money for your eventual system purchase.

Power Mac via Motherboard Apple's motherboard replacements don't make much sense for most 040 Macs, because the prices don't justify the performance boost. Basically, it's cheaper to get a Power Macintosh Upgrade Card. For example, you could spend about $1500 to replace a Quadra 650's motherboard with a 7100/66's motherboard, or you could add a $700 upgrade card and get the same performance. Even when the performance is not equivalent, you have to question the wisdom of a motherboard replacement: is it worth $1500 to turn a 25MHz Centris 650 into a 66MHz Power Mac 7100 when you can spend $700 to turn that same Centris into a 50MHz Power Mac? Or spending $1900 to turn a 33MHz Quadra 800 into an 80MHz Power Mac 8100 when you can spend $700 to turn the same Quadra into a 66MHz Power Mac?

However, for certain Macs—especially the relatively poky Centris 610—the motherboard replacement is worthwhile. For the 20MHz Centris 610 and the 25MHz Quadra 610, the motherboard replacement costs about $1000. At that price, the performance difference just about matches the price difference: a 40MHz Power Mac Centris 610 for $700 has essentially the same price/performance ratio as a 60MHz Power Mac 6100 for $1000.

Owners of the 030-based IIvx, IIvi, and Performa 600 should go for a Power Mac motherboard replacement. You get a 66MHz Power Mac 7100 for just $1500 ($1700 for the AV model), which is about what it would cost you to buy a new Power Mac 7100 and sell your current Mac—but without the hassle.

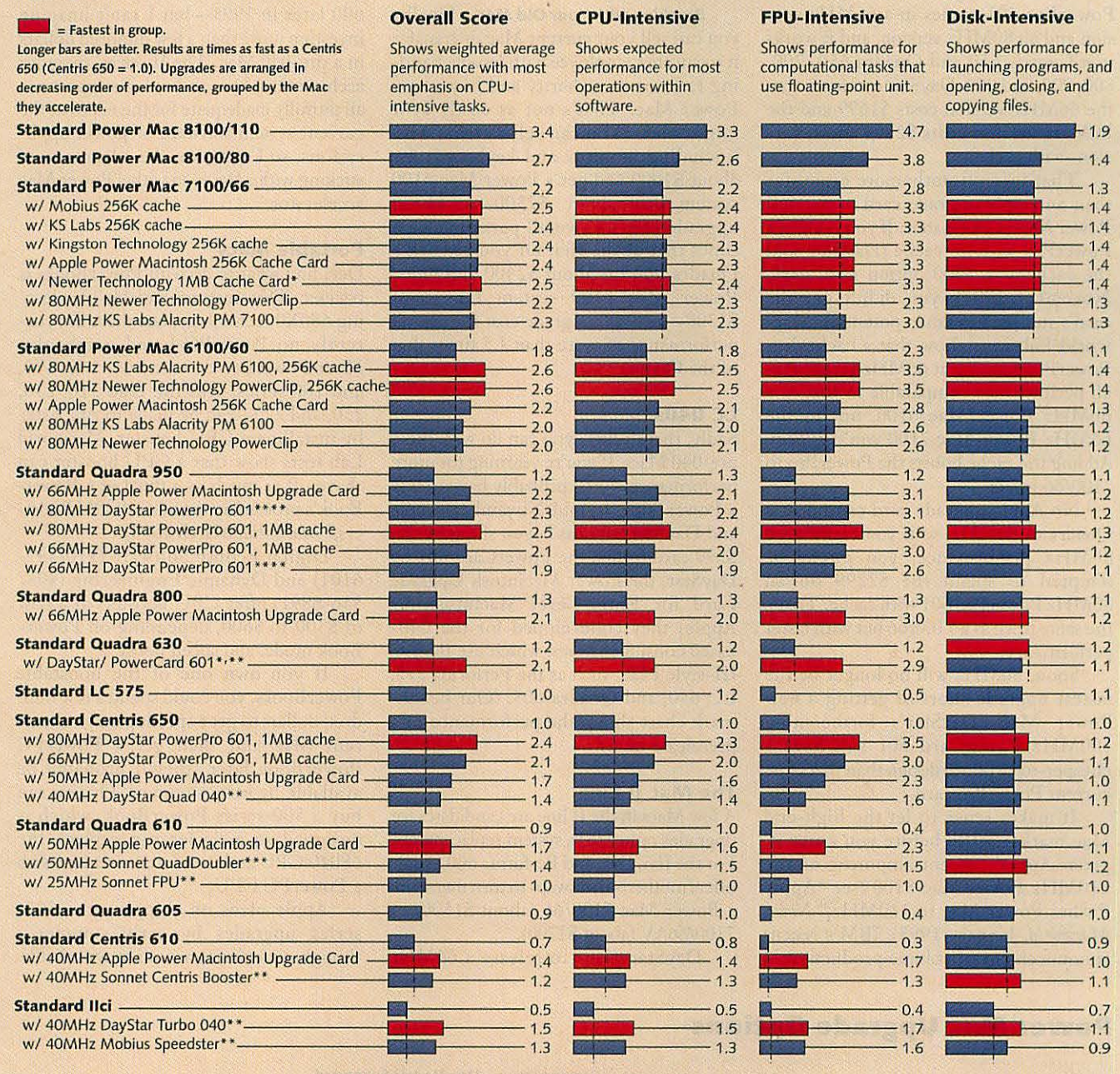
For AV technology, you have no choice but to replace the motherboard, since Apple's upgrade card doesn't work in any AV Centris or Quadra. However, I'd hold off on swapping an AV motherboard, since it's clear that Apple's next generation of Power Macs will have better AV technology than the current generation does (see "PCI Power Mac Preview," *News, Macworld*, December 1994).

MW LAB

What Mac Upgrades Give the Top Performance?

= Fastest in group.

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Upgrades are arranged in decreasing order of performance, grouped by the Mac they accelerate.



*Prerelease unit; performance of shipping unit may vary. **The same as Apple's Power Macintosh Upgrade Card for Entry-Level Macintosh. ***Upgrade option does not convert the Mac to a Power Mac. ****No longer sold without cache; results shown for comparison.

BEHIND OUR TESTS

These new Macworld Lab tests emphasize the performance abilities of the new Power Macintoshes and 040-based Macs. We tested their operation in eight applications plus the Finder and then ranked the results against the performance of a Centris 650. We then combined those rankings into three basic performance areas.

The CPU-Intensive tasks evaluate the Mac's essential computing performance, and indicate the speed you'll get for most operations within your software. Having a cache in a system improves performance noticeably for these tests. The FPU-Intensive tasks gauge performance for tasks that take advantage of the floating-point unit built into the PowerPC 601 and 040 CPUs (an FPU is optional in other Macs' CPUs). The Disk-Intensive tasks gauge the performance you'll get for launching programs, opening and closing files, and copying files. *Macworld* no longer reports the results for video-intensive operations since the built-in circuitry on 040 and Power Macs is now fast enough that video operations rarely affect overall performance.

The CPU-Intensive tasks include Gaussian blurs and unsharp masks in Adobe Photoshop 3.0; printing to PostScript files in Adobe Illustrator 5.5 and Adobe's PageMaker 5.0; previewing, rotating, and resizing in Illustrator; adjusting dye concentration in Fractal Design's Painter 2.0; video compression and movie assembly in Adobe Premiere 4.0; and scrolling and font changes in PageMaker 5.0.

FPU-Intensive tasks include recalculations in Microsoft Excel 5.0; surface texturing and automatic cloning in Painter; rendering in Specular's Infini-D 2.6; and workbook evaluations in Wolfram Research's Mathematica 2.2.2. Disk-Intensive tasks include file opens in Photoshop, Painter, and PageMaker, plus file duplications in the Finder. The Overall Score combines the three tests: 60 percent for the CPU results and 20 percent each for the FPU and disk results. These overall scores cannot be compared against previous *Macworld* features' and reviews' Core-Performance Index.

Our 680X0 test systems used 16MB of RAM, a 96K disk cache, and 16-inch monitors operating at 8-bit color depth (256 colors) under System 7.5. The Power Mac test systems had similar configurations, except they used 24MB of RAM with virtual memory turned off.

For Apple's motherboard replacements, refer to the results for the new systems. For systems using CPU boosters, we report the results for the fastest speed we could set the booster to run at reliably.—**Macworld Lab testing supervised by Mark Hurlow and Danny Lee**

You can also buy a Power Mac upgrade card from DayStar Digital (see "Power Mac Upgrade Options"). The PowerPro 601 comes in a 66MHz version and an 80MHz version, and it works in a Centris 650 and Quadra 650, 700, 800, 900, and 950. DayStar estimates that the 66MHz version costs $1699 and the 80MHz version costs $2299 (both versions with cache).

That's significantly more expensive than an Apple upgrade card to get full Power Mac performance. If you bought a PowerPro with no cache (DayStar sold the cache as a $400 option until early November 1994), you didn't get the card's full performance potential. Macworld Lab tests show that a cache-less PowerPro running at 66MHz gives overall performance comparable to that of a 60MHz Power Mac 6100, not to the 66MHz Power Mac 7100 you'd expect. Adding the cache boosts the PowerPro to 7100/66 levels.

No Apple upgrade card can boost a Quadra to 80MHz, so if you really need 80MHz performance, you might be tempted to spend the $2299 on an 80MHz PowerPro 601 with cache. That's the same price as a 7100/66 but with faster performance.

Soon, 80MHz will no longer be the fastest upgrade short of getting a new Power Mac. DayStar's forthcoming 100MHz PowerCard 601 will have a cheaper-to-produce design than that of its current PowerPro card.

It makes sense to let the high-end Mac market settle before you enter it, given Apple's recent shipment of the 110MHz Power Mac 8100 (see "Apple Pushes Power Mac to 110MHz," *News, Macworld*, January 1995), IBM's recent announcement of volume production of 100MHz PowerPC CPUs, and DayStar's promise of 100MHz Power Mac 601 cards in January.

Breaking with Your Old Mac Finally, you can sell your current Mac or transfer it to another employee with less-demanding tasks or to a charity and buy a new Power Mac. That's not as costly as it might seem. You can sell a IIci system (including monitor and keyboard) for about $1000 and get a Power Mac 6100 system for about $2500—a $1500 upgrade cost for overall performance 5 times that of the IIci. Or you can sell a Quadra 900 for about $2400 and buy a Power Mac 7100 system for about $3200—an $800 upgrade cost for overall performance of more than 1.5 times that of the Quadra 900.

LC 040s

Sadly, there's little you can do with most pre-040 Macs. If you're yearning for more performance, you'll probably have to buy a Power Mac. In mid-November, Apple and DayStar had just begun shipping the $599 card (called the PowerCard 601 by DayStar, the Power Macintosh Upgrade Card for Entry-Level Macintosh by Apple) they codeveloped for the 040-based consumer Macs, which use the LC III–style PDS, such as the Performa 575, LC 630, and Quadra 605. (Our benchmark chart shows the performance of a prerelease unit.)

The Mac II Line

A few Macs in the II line are candidates for upgrades rather than system replacements. For the IIvi, IIvx, and Performa 600, Apple offers motherboard swaps to turn them into a Power Mac 7100/66 (about $1500) or 7100/66AV (about $1700).

DayStar plans to release a 66MHz PowerCard 601 accelerator for the IIci in January—and it promises a 100MHz version for the IIci, IIvx, IIvi, and Performa 600 later in 1995—but I can't imagine investing more than a few hundred dollars in a pre-040 Mac. The II series' memory architecture, bus, and video support are all pitifully inadequate for the needs of the current system software or power applications, so I question the advantage of sticking with a IIci even with a Power Mac accelerator.

Portable Macs

Deciding what to do with PowerBooks is trickier. They may use quickly obsolescing 680X0 technology, but there are currently no PowerPC-based notebooks. Most PowerBooks—the 140, 160, 170, and 180 series, plus the Duo 210, 230, 250, and 270—can be made to run faster by installing a CPU booster. Macworld Lab tests show that a CPU booster can shave off as much as a third of a PowerBook's processing time (see "CPU Boosters," *Macworld*, March 1994).

Digital Eclipse Software (510/547-6101) and Dynamic Engineering (408/336-8891) offer CPU boosters at a cost of $300 to $600, depending on PowerBook model and speed boost.

If you own one of the boostable PowerBooks, you could spend a few hundred dollars to get a speedup on your current Mac and then get a PowerPC PowerBook later (they'll probably be available by early summer). Or you can buy a 500-series PowerBook, which is designed so a dealer can replace the 68040 CPU and its related circuitry with a PowerPC CPU.

Apple plans on shipping the 500-series upgrades by early summer—though such plans are not always reliable.

Power Mac Upgrade Options

Company	Product	Company's Estimated Price	Mac Models Supported (upgraded speed)
Apple Computer 408/996-1010	Power Macintosh Upgrade Card	$699	Centris 610 (40MHz), 650 (50MHz); Quadra 610 (50MHz), 650 (66MHz), 700 (50MHz), 800 (66MHz), 900 (50MHz), 950 (66MHz)
	Power Macintosh Upgrade Card for Entry-Level Macintosh	$599	LC/Performa 470 series (50MHz), LC/Performa 570 series (66MHz), LC/Performa/Quadra 605 (50MHz), LC/Performa/Quadra 630 (66MHz)
	Power Macintosh 6100/60 motherboard	$999	Centris 610, 660AV; Quadra 610, 660AV (all to 60MHz)
	Power Macintosh 6100/60AV motherboard	$1399	Centris 610, 660AV; Quadra 610, 660AV (all to 60MHz)
	Power Macintosh 7100/66 motherboard	$1499	IIvi, IIvx, Centris 650, Quadra 650, Performa 600 (all to 66MHz)
	Power Macintosh 7100/66AV motherboard	$1699	IIvi, IIvx, Centris 650, Quadra 650, Performa 600 (all to 66MHz)
	Power Macintosh 8100/80 motherboard	$1899	Quadra 800, 840AV (both to 80MHz)
	Power Macintosh 8100/80AV motherboard	$1999	Quadra 800, 840AV (both to 80MHz)
DayStar Digital 404/967-2077, 800/962-2077	66MHz PowerPro 601 with FastCache	$1699	Centris 650; Quadra 650, 700, 800, 900, 950 (all to 66MHz)
	80MHz PowerPro 601 with FastCache	$2299 *	Centris 650; Quadra 650, 700, 800, 900, 950 (all to 80MHz)
	PowerCard 601	$599	LC/Performa 470 series (50MHz), LC/Performa 570 series (66MHz), LC/Performa/Quadra 605 (50MHz), LC/Performa/Quadra 630 (66MHz)

* *$1899 after January 1, 1995.*

Who Offers Power Mac Software

Power Mac software has proliferated rapidly in the last few months, as the following table shows. It lists programs shipping as of November 1, 1994; for more recent releases, look at *Macworld*'s various news sections, particularly *Power Mac News*. When looking through the table, note that some popular programs will be found under their new owner (for example, Aldus products are listed under Adobe Systems and Altsys products under Macromedia). All products listed ship with 680X0 Mac and Power Mac versions in the same box, unless otherwise noted. Also, different upgrade prices may be available for users of earlier versions; check with the company. In some cases, the previous version is the same as the current version; that indicates a program previously available only in 680X0 Mac format now available in Power Mac format.—**Galen Gruman, Matthew Hawn, and Joanna Pearlstein**

Company	Phone	Product	List Price	Upgrade Price (from version)	Type of Program
2 Way Computing	619/452-3888	2Way Talker 2.2	$49	free (all)	voice communication
Abacus Concepts	510/540-1949	Statview 4.1	$595	free (4.0.2)[A]	statistical analysis
About Software	408/725-4242	5PM Pro 2.2	$3545	$1418 (2.1)	mainframe connectivity
		5PM Term 2.2	$249	$99 (2.1)	mainframe connectivity
Absoft	810/853-0050	Fortran 77 SDK[B]	$699	$399 (all)	compiler
ACI US	408/252-4444	4D First 1.2	$99	free (1.0)	database
		4D Server 1.2	$1195	free (1.1)	database server
		4th Dimension 3.2	$895	free (3.1)	database
Adobe Systems	415/961-4400, 800/833-6687	After Effects 2.0.1	$1995	$79 (2.0)	video effects
		After Effects Rendering Engine 2.0.1	$495	NA[C]	video effects
		Color Central 2.2	$3995	free (2.1)[A]	prepress
		Dimensions 2.0	$199	$69 (1.0)	3-D type effects
		Illustrator 5.5	$595	$99 (5.0)	drawing
		PageMaker 5.0	$895	$179 (5.0)	publishing
		Persuasion 3.0	$495	$75 (2.1)	presentation software
		Photoshop 3.01	$895	$149 (2.5.1)	image editing
		Premiere 4.0	$795	$129 (3.0)	video editing
		TrapWise 2.1	$4995	free (2.0)	color trapping
		Type Manager 3.8	$60	$30 (3.6)	type scaling
Aladdin Systems	408/761-6200	DropStuff with Expander Enhancer 3.5.2	$30	NA[C]	compression
		StuffIt Deluxe 3.5	$130	$35 (all)	compression
		StuffIt Expander 3.5.2	free	free (3.5)	compression
		StuffIt Lite 3.5	$30	$10 (all)	compression
		StuffIt SpaceSaver 3.5	$80	$30 (3.0)	compression
Alias Research	416/362-9181, 800/447-2542	Alias Sketch 2.0	$695	$199 (1.5)	modeling
Apple Computer	408/996-1010	Personal Diagnostics 1.1	$99	$19 (1.0)	utility
		PhotoFlash 2.0	$129	$40 (1.1)	image cataloging
Artifice	503/345-7421	Design Workshop 1.2[B]	$695	$49 (1.1)	3-D CAD
Ashlar	408/746-1800	Vellum 3D 2.5	$2995	$14 (2.5)	3-D modeling
autodessys	614/488-9777	formZ 2.6	$1495	$125 (2.6)	3-D modeling
Avid	508/640-6789	VideoShop 3.0	$395	$79 (2.0)	video editing
BAGH Technologies	514/273-0522	Architrion 5.8	$4500	$95 (5.7)	CAD
Blyth Software	415/571-0222	Omnis (7^3)[B]	$5000	$500 ($7^2$)	database
Bungie Software Products	312/563-6200	Pathways into Darkness 2.0	$70	free (1.0)	game
CAChe Scientific	503/531-1800	WorkSystem 1.0[D]	$29,990	varies	chemical analysis
Caere	408/395-7000, 800/535-7226	OmniPage Professional 5.0	$695	none	OCR
Canto Software	415/431-6871	Cirrus PowerLite 2.1	$195	NA[C]	scan manipulation
		Cirrus PowerPro 2.1	$495	$99 (Cirrus 2.0)	scan manipulation
		Cumulus PowerLite 2.0	$199	NA[C]	graphics database
		Cumulus PowerPro 2.0	$1495	$249 (1.2)	graphics database
Casady & Greene	408/484-9228	Conflict Catcher II 2.1	$80	$15 (2.0)	utility
Central Point Software	503/690-8088, 800/278-6657	MacTools 4.0	$150	$50 (3.0)	utility
Changeling Software	203/292-5087, 800/769-2768	PegLeg 1.0.3	$40	NA[C]	game

[A] *If 680X0 version purchased after March 14, 1994.* [B] *680X0 Mac and Power Mac versions sold separately.* [C] *No previous version.*
[D] *No 680X0 version available.* [E] *Until December 31, 1994.*

table continues

(Apple says it will design the PowerPC PowerBooks to work with current 500-series PowerBook RAM.)

If you don't have a PowerBook and need one, don't hesistate to buy one of the excellent 500-series units. But if you already have a pre-500–series PowerBook, I suggest that you sit tight. It's not clear what Apple will offer for its PowerPC PowerBooks, and there's no sense spending money now for a small boost, or for an 040 PowerBook, and then replacing the system a half year later with a PowerPC-based model. (See *PowerBook Notes*, in this issue, for other PowerBook upgrade information.)

Compact Macs

You could spend a couple hundred dollars for moderately performing upgrade cards from companies like DiiMo and Brainstorm Products, but why bother? If you're still using these Macs, they're either adequate for your needs or woefully inadequate. If they're woefully inadequate, a small performance boost won't change that. From a compact Mac, go for a Quadra 630 if your computing needs are modest, or better yet, a Power Mac 6100.

Ask whether you really need an immediate speed boost

The Cost of Memory

Macs released since winter 1993 use 72-pin SIMMs while older models use 30-pin SIMMs, so if you trade up to a Power Mac or new 68040 Mac, you will likely need to get new RAM. If you're a Photoshop user, that can cost several times the Mac upgrade itself. For example, getting 128MB of RAM—typical for a professional image editor—costs about $5200.

Can You Retain Older RAM? Holding onto old memory is one of the attractions of DayStar's PowerPro cards, since they can use the memory on your 040 Mac's motherboard, whether it's 30-pin or 72-pin. But that attraction holds more promise than it delivers. All Quadras but the 700, 900, and 950 use 72-pin SIMMs, which a Power Mac can use if the RAM is 70 nanoseconds or faster.

And while the DayStar PowerPro cards let you leave your 30-pin SIMMs on the motherboard of your Quadra 700, 900, or 950 and let you add 72-pin SIMMs to the card, using only the 30-pin SIMMs on your Mac's motherboard slows the PowerPro considerably—DayStar's software even warns you of that at start-up.

Macworld Lab tests show that for some tasks—including recalculations in Microsoft Excel 5.0, scientific analysis in Wolfram Research's Mathematica 2.3, printing in Adobe Illustrator 5.5, and rendering in Specular International's Infini-D 2.6—the addition of the DayStar FastCache PowerPro 1MB cache card to the PowerPro card increases performance by 20 to 35 percent. For other tasks—such as applying filters and color-space conversions in Adobe Photoshop 3.0 and changing fonts in Adobe PageMaker 5.0a—the performance difference is 10 percent or less. Now that DayStar includes the cache with its PowerPros, you get that extra performance for free.

The much cheaper Apple upgrade card ($600 to $700, depending on where you buy it) also lets you keep the motherboard's 30-pin SIMMs, and it includes a 1MB cache to help compensate for the motherboard's slower memory speed. But the Apple card accepts no memory of its own, so you can't expand your memory as with the PowerPros.

Don't upgrade until you can afford the cost of new RAM. If you need an immediate performance boost, spend as little as possible to improve your current system as an interim solution and save the big bucks for your new system with the RAM you will ultimately need.

Why Virtual Memory Is a Must No matter what kind of SIMMs you have, moving to Power Mac means buying more RAM. Native Power Mac programs typically need 50 to 150 percent more RAM than their 680X0 versions.

That's why Apple recommends you use virtual memory on a Power Mac—to increase the effective memory amount so you can actually run your programs. A better solution is getting Connectix Corporation's $99 RAM Doubler 1.5.1 (415/571-5100), which increases the amount of memory via compression, which results in faster performance than using disk-based virtual memory. (RAM Doubler and virtual memory cannot be active simultaneously, however.)

Even if you use RAM Doubler, make sure you have enough physical memory. A Power Mac should have 16MB of RAM; that will let it run System 7.5 with large files in programs like QuarkXPress or Excel. If you're just doing word processing or spreadsheet manipulation, you can get away with 8MB of RAM—as long as you use just the core components of System 7.5 (no QuickDraw GX and no PowerTalk).

Do You Need Extra Cache? Many software companies say you need extra cache for a Power Mac, and Apple has thoughtfully included cache slots in the 6100 and 7100 (the 8100 comes with a 256K cache card already installed). But do you really need the cache?

Macworld Lab tests show that a cache card makes a Power Mac run between 10 and 20 percent faster than a system without the cache. In some cases, a cache card even gives better performance than a CPU booster. The operations most affected depend on your applications. If you're doing moderate text editing, page layout, or spreadsheet recalculations, you can get by without spending the extra $200 to $300 that a 256K cache card costs.

But the more computing-intensive the work you do, the more benefit you'll see from a cache. And *computing-intensive* does not mean just scientific analysis or 3-D modeling. Printing PostScript files is computing-intensive, and it's an area that can really benefit from a cache card. Speeding computation up by 50 percent cuts the time your Mac is tied up by about 66 percent. Professional layout artists will definitely want a cache.

But don't throw money away on a large cache. The typical performance difference between a 256K cache card and a 1MB cache card is just four percentage points, according to Macworld Lab tests. Cache maker Newer Technology says only a few areas, such as program recompilation and 3-D ray tracing, benefit notably from a cache larger than 256K.

And don't worry too much about where you get your cache card. Macworld Lab tested 256K cache cards from five companies. While there were some slight differences in performance, the only real difference is the prices, which range from $159 to $299.

Who Offers Power Mac Software (continued)

Company	Phone	Product	List Price	Upgrade Price (from version)	Type of Program
Charles River Analytics	617/491-3474, 800/913-3535	Open Sesame 1.1	$59	free	utility
Claris	408/987-7000	ClarisDraw 1.0	$399	$89 (MacDraw Pro)	drawing
		ClarisImpact 1.0v3	$399	$13 (1.0)	charting
		ClarisWorks 3.0	$129	$59 (2.0)	integrated software
		FileMaker Pro Server 1.0	$1499	NA[C]	database
		MacWrite Pro 1.5v3	$99	$69 (1.5)	word processing
Common Knowledge	415/325-9000, 800/954-3800	Arrange 2.0	$349	$30 (2.0.1)[E]	personal information manager
Connectix	415/571-5100, 800/950-5880	RAM Doubler 1.5	$99	$10 (1.04)	utility
Dantz Development	510/253-3000	Retrospect 2.1	$249	$20 (2.0)	backup
		Retrospect Remote 2.1	$449	$30 (2.0)	backup
Data Description	607/257-1000	Data Desk 4.2	$595	$45 (4.0)	statistical analysis
DeltaPoint	408/648-4000	DeltaGraph Pro 3.5	$195	$30 (3.0)	charting
Deneba Software	305/596-5644, 800/733-6322	Canvas 3.5	$399	$130 (3.0)	illustration
Domark Software	415/513-8929, 800/695-4263	Flying Nightmares 3.1	$49	none	game
		Out of the Sun 1.0	$50	none	game
Elastic Reality	608/273-9240	Elastic Reality 1.2	$349	$50 (1.1)	morphing
Engineered Software	910/299-4843	PowerCADD 1.0[B]	$795	$79 (PowerDraw 6.0)	CAD
Equilibrium	415/332-4343	DeBabelizer 1.6	$399	$49 (1.5)	graphics translation
Fractal Design	408/688-5300	Dabbler 1.0	$99	NA[C]	image editing
		Painter 3	$499	$149 (2.0)	image editing
Frame Technology	408/975-6000	FrameMaker 4.0.4	$895	$95 (4.0)	publishing
FWB	415/775-2125	CD-ROM Toolkit 1.1	$79	$29 (1.1)	utility
		Hard Disk Toolkit 1.6	$199	$39 (1.0)	utility
		Hard Disk Toolkit Personal Edition 1.6	$79	$29 (1.5)	utility
		RAID Toolkit 1.6	$499	$99 (1.4)	utility
Graphic Magic	408/464-1949	Multiframe 4D 1.0	$1995	$795 (Multiframe 3D 1.0)	structural analysis
		Multiframe 3D 2.0	$1495	$150 (1.0)	structural analysis
Graphisoft	415/737-8665, 800/344-3468	ArchiCAD 4.5	$4450	free (4.12)	CAD
Graphsoft	410/290-5114	Blueprint 5	$295	$99 (4.0)	CAD
		MiniCad 5	$795	$150 (4.0)	CAD
Gryphon Software	619/536-8815	Morph 2.5	$149	$49 (2.01)	image effects
Hash	206/750-0042	Animation Master 2.08	$1049	$100 (2.08)	animation
HSC Software	805/566-6200	Kai's Power Tools 2.1	$199	$30 (2.0)	image editing
		KPT Bryce 1.0	$199	NA[C]	landscape rendering
		Live Picture 1.5.5	$3995	free (1.5.5)	image editing
Insignia Solutions	415/694-7600, 800/848-7677	SoftWindows 1.0[B]	$499	$149 (SoftPC 3.1)	PC emulation
Inspiration Software	503/245-9011	Inspiration 4.1	$195	$30 (4.0)	brainstorming
Intercon Systems	703/709-5500, 800/468-7266	TCP/Connect II 2.0	$495	$99 (1.2.1)	terminal emulation
Kent Marsh	713/522-5625	FolderBolt Pro 1.0	$130	$39 (FolderBolt 1.0)	security
Macromedia	415/252-2000	Director 4.0	$1195	$25 (4.0)	multimedia
		Fontographer 4.1	$495	$99 (4.0.4)	type editing
		FreeHand 4.0a[B]	$595	$99 (3.0)	drawing
Mainstay	805/484-9400	VIP-C 1.5	$495	$50 (1.0)	compiler
Microsoft	206/882-8080, 800/426-9400	Excel 5.0	$339	$129 (4.0)	spreadsheet
		FoxPro 2.6	$99	$20 (2.5)	database
		FoxPro Professional 2.6	$695	$49 (2.5)	database
		PowerPoint 4.0[B]	$339	$129 (3.0)	charting
		Word 6.0[B]	$339	$129 (5.1)	word processing
National Instruments	512/794-0100, 800/433-3488	HiQ 2.1	$695	$195 (2.0)	data analysis
John Neil & Associates	415/661-2943	SoftwareFPU 3.0	$20	$10 (2.0)	FPU emulation

[A] If 680X0 version purchased after March 14, 1994. [B] 680X0 Mac and Power Mac versions sold separately. [C] No previous version.
[D] No 680X0 version available. [E] Until December 31, 1994.

table continues

The Cost of Software

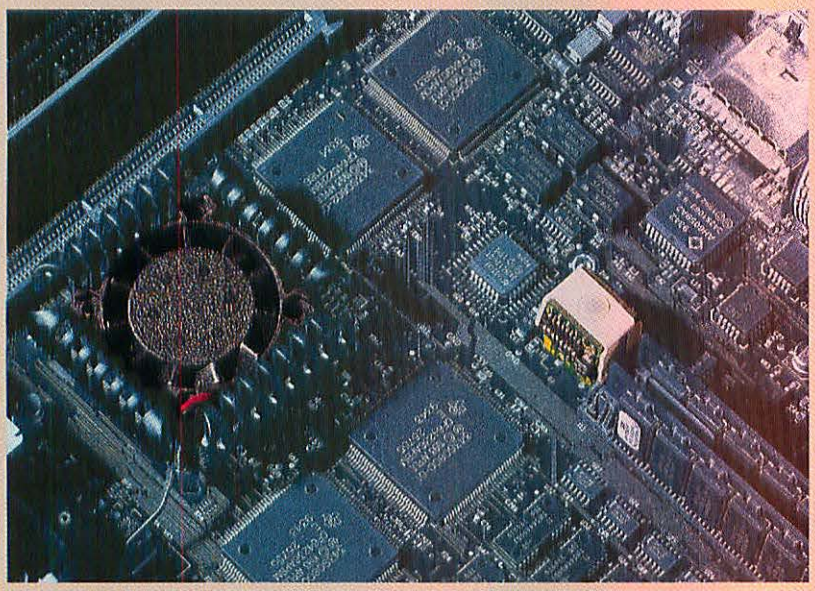
The other big cost of upgrading to Power Mac is the price of software. If you have five or six programs, you may end up spending $500 to $1000 to get the native Power Mac versions. Or will you?

Although there is a definite performance penalty to using 680X0 software on a Power Mac, for much mainstream software it is acceptable. If you currently have an 030-based Mac, your 680X0 software will run faster on a Power Mac under emulation than the same 680X0 software does on your 030 Mac. Owners of 040 Macs will see some slowdown on a Power Mac, but we've found the slowdown to be a problem only with certain programs. For example, the 680X0 versions of Fractal Design Painter and Adobe Photoshop crawl on a Power Mac (you can speed them up somewhat by increasing their memory allotments). So does any program that is optimized for floating-point calculations, such as Microsoft Excel and Wolfram Research's Mathematica. But mainstay programs like Adobe's PageMaker, Novell's WordPer-

EVEN FASTER POWER MACS

After adding a cache card, the next easiest way to get more kick from your Power Mac (including Quadras with a Power Macintosh Upgrade Card) is to increase the heartbeat, or the clock frequency, of the CPU. Newer Technology and KS Labs offer clock-crystal boosters for the Power Mac 6100 and 7100. While both boost performance by the same amount, their designs and prices differ notably. Also, because they make your Mac work at speeds it was not designed to, using such boosters naturally invites questions about reliability. Macworld Lab tested the boosters for a cost-benefit and reliability analysis.

Clock boosters became viable commercial products when Apple changed the type of clock crystal it used on its motherboards. Before the Quadras, Apple used oscillators embedded in a tiny tin can. Making these Macs run faster meant soldering a new oscillator onto the motherboard—something that voided your warranty—or laboriously rewiring the motherboard to use a new oscillator. But the new ceramic clock crystal makes it much easier to speed up the Mac—the boosters just clip onto the oscillator's wires and short out pins 1 and 2, thereby disabling the oscillator but leaving it intact. The crystal in the clock booster then sends its own oscillator signal to the motherboard. (Apple has neither endorsed nor warned against using the product, but doing so will void your warranty.)



The New Technology PowerClip CPU booster with CPU cooling fan (highlighted at right and left, respectively).

Of the two clock boosters we looked at, the Newer Technology PowerClip has the better speed-switching feature; it lets users switch settings without physically replacing the booster's crystal. The PowerClip's small circuit board lets you change the crystal speed in 0.4MHz increments over a 40MHz range. Thus, if your Mac won't run at the booster's top speed, you can ratchet down the speed until your Mac does run. To solve the same problem with KS Labs' Alacrity PM 6100 booster, you need to get a new, slower crystal from KS Labs or an electronics supply store and see if it works. (Newer plans to release PowerPump, a clock booster designed to boost Quadras with the Power Macintosh Upgrade Card. The PowerPump boosts the 040 and the PowerPC CPUs separately, letting you get maximum performance in both modes. With the PowerClip or Alacrity PM boosters, the oscillator gives both CPUs the same speedup.)

You can tell if the booster is running too fast if your Mac never gets past the start-up screen, if the system locks up consistently after a period of use (that period varies from machine to machine), or if the Mac suddenly has trouble finding files or network nodes. Macworld Lab recommends that you not push your system to its top boosted speed; instead, ratchet the performance down a few megahertz to leave a margin for error. Macworld Lab tests also found that a clock booster gives its best performance if you have a cache card installed.

When the clock frequency goes up, so does the temperature of the CPU. To combat potential overheating, both clock boosters ship with cooling fans. Macworld Lab tests show that the fans keep the CPU cool.

Installation is straightforward: just clip the booster to the motherboard's oscillator in the direction indicated in the booster's manual. If installed in the wrong direction, the PowerClip won't function or cause harm, but the Alacrity PM could permanently disable your motherboard. Also, unlike the PowerClip the Alacrity PM is not certified to meet government radio-frequency emission standards, called FCC Class B. It's technically illegal to use uncertified devices in a home or business, because theoretically a device might interfere with police or other emergency transmissions, but the risk is tiny at most.

The extra circuitry, stronger clip mechanism, and testing for FCC certification contribute to the PowerClip's higher cost ($245, compared with the Alacrity PM's $145—which should drop to $99 by the time this appears). Essentially, you're buying peace of mind.—**Mark Hurlow**

Who Offers Power Mac Software (continued)

Company	Phone	Product	List Price	Upgrade Price (from version)	Type of Program
Neon Software	510/283-9771, 800/334-6366	LANsurveyor 1.1	$395	free (1.0)	network management
		NetMinder Ethernet 3.2	$695	free (3.1)	network management
Novell Applications Group	801/225-5000	WordPerfect 3.1	$395	$69 (3.0)	word processing
Now Software	503/274-2800	Contact 1.1	$99	$20 (1.0)	contact management
		Now Utilities 5.0	$90	$40 (4.0)	utilities
Npath Software	206/392-7745	Tableworks Plus 2.0	$299	$120 (1.0)	QuarkXPress table editing
Pixar	510/236-4000, 800/888-9856	Typestry 2.1	$299	$49 (2.0)	typographic effects
PixelCraft	510/562-2480	ColorAccess drivers	varies	varies	scanner drivers
Quark	303/894-8888	QuarkXPress 3.31[B]	$895	$225 (3.3)	publishing
Radius	408/541-6100, 800/227-2795	QuickFlix 1.1	$149	NA[C]	video editing
		VideoFusion 1.6.1	$649	$25 (1.5)	video editing
Ray Dream	415/960-0768	Designer 3.1.1	$349	$29 (3.0)	3-D modeling
Sassafras Software	603/643-3351	KeyServer 4.0	$680	varies	security
Signal Analytics	703/281-3277	IPLab Gel 1.5	$850	free (1.1)	scientific gel reader
		IPLab Spectrum 2.5.5	$1200	free (2.5)	signal analysis
SoftArc	905/415-7000, 800/364-1923	FirstClass 2.6	$95	free	group communication
Specular International	413/253-3100, 800/433-7732	Collage 2.0.1	$399	$49 (1.0)	graphics
		Infini-D 2.6	$695	$49 (2.5)	3-D modeling
		LogoMotion 1.5	$149	$39 (1.0)	3-D animation
		TextureScape 1.5	$195	$29 (1.0)	texture generator
Spider Island Software	714/669-9260	TeleFinder BBS 3.5	$425	$95 (3.2)	BBS software
Strata	801/628-5218, 800/869-6855	StudioPro 1.5	$1495	$99 (1.1)	3-D modeling
		StrataVision 3.1a	$695	$99 (3.0)	3-D modeling
Symantec	503/334-6054, 800/441-7234	ACT 2.0	$250	$50 (1.0)	contact manager
		Norton DiskDoubler Pro 1.1	$109	free (SuperDoubler)	compression
		Norton Utilities (NUM) 3.1	$149	$40 (2.0)	utilities
		Symantec AntiVirus (SAM) 4.0	$99	$30 (3.0)	utilities
Trillium Research	715/381-1900	Remus 1.2.5	$590	free (all)	RAID
		Remus Limited 1.2.5	$295	free (all)	RAID
usrEZ Software	714/756-5140, 800/482-4622	ultraSecure 3.52	$239	$39 (all)	security
		ultraShield 2.52	$149	$29 (all)	security
Virtus	919/467-9700, 800/847-8871	Virtus VR 1.0.1	$99	$20 (1.0)	3-D modeling
		Walkthrough Pro 2.0	$495	$99 (1.0.5)	3-D modeling
Wolfram Research	217/398-0700, 800/441-6284	Mathematica 2.2	$995	$135 (2.1)	data analysis
Xerox	415/813-6800, 800/248-6550	TextBridge 2.0	$99	$49 (2.0)	OCR

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fect, and Microsoft Word are fine.

First upgrade programs that will see the biggest performance boost or that do not run under emulation (anything that requires a 680X0 FPU).

Next, upgrade programs that have a new version. Most new software comes with the 680X0 and Power Mac versions in the same box or gives you a choice of what version to get. If you have already upgraded to a new 680X0 version, see if the company will let you upgrade again to the Power Mac version rather than buy a new copy.

Finally, upgrade programs that have no new version but have a native Power Mac version available. Prices for such so-called sidegrades are generally cheap, often less than $50 (see the table "Who Offers Power Mac Software"). Of course, if the 680X0 version's performance is acceptable, you can just wait until a new version comes out and then get the Power Mac version.

If you also use a PowerBook, your software-upgrade strategy is a bit more complex. Some companies license software for use on two machines as long as they're not in use simultaneously. That means you can load, say, Microsoft Excel on your PowerBook and your Power Mac, if you use the PowerBook only when you're not using your Power Mac. Check with the developer to find out the least expensive upgrade option for such dual-machine situations.

Which Power Mac?

Once you've made the decision to buy a Power Mac, which one should you buy? When the Power Macs first came out nine months ago, the choice was easy. The 6100 was a great general-purpose system for those who didn't need NuBus expansion. The 7100 offered high performance plus NuBus expansion and generous memory capacity. The 8100 was the king of the hill for intensive tasks like multi-

media authoring, database servers, and color prepress. Today, the Power Macs shake down differently. It's not that their performance or features have changed much—the issue is that six or so months from now, the current Power Macs will likely be replaced with Macs that offer better expansion buses and AV technologies.

Apple's first generation of Power Macs was meant to be highly compatible, to calm a customer base uneasy about the transition from one line of CPUs to another. So the first Power Macs were basically just faster Quadras. The next generation, though, due by summer 1995, will implement new technologies.

The next generation will implement

new technologies

Apple is keeping mum about most of them, but according to developers working with prototypes, there may be significant differences in SIMM support, which could render obsolete any RAM you bought for a current Quadra or Power Mac. (Apple confirmed it was exploring various memory architectures and would not commit to RAM compatibility, saying it was too early in the development cycle to do so.)

If you intend to buy NuBus cards, the same tension—between the benefits of an immediate upgrade and the long-term cost savings of waiting until Apple makes the transition to its new core technologies—applies. Current Power Macs support NuBus, but the next generation of Macs will not. Instead, they'll use the Peripheral Component Interconnect (PCI) bus. For video display, all but the highest-end users will find that the Apple PDS-based video card in today's Power Macs is as fast as their NuBus video cards.

If you want to keep your NuBus video card, check with the company that sold it; you'll need new software and perhaps ROMs for it to run in accelerated mode.

If you've already invested in expensive NuBus cards, you may have two choices. One is to get a current Power Mac and use that system for several years while you set aside money for the eventual replacement of both the cards and the Power Mac. That may not be as bad as it seems, since you're likely to replace your cards at some point anyhow in the normal course of upgrading your system's capabilities. If you're close to replacing your cards now, hold off and get a PCI Power Mac and PCI cards when they become available sometime in the latter part of 1995. If you're far from that point, get a NuBus Power Mac now so you can get a return on your investment in NuBus cards.

Owners of the new 8100/110 have a second choice: get a NuBus Expansion Chassis from Second Wave (512/329-9283). Because Apple left out critical support for more than three NuBus cards in the Power Macs' ROM and motherboard circuitry, Second Wave's current chassis works only in the Power Mac 8100/110. (The NuBus standard specifies support for 16 cards on one computer.) But Second Wave is working on a PCI-to-NuBus expansion box, with Apple's support, so you can keep those NuBus cards for later use with the PCI Power Macs.

The Last Word

For most Mac owners, there are really just two basic choices to make in moving up to Power Mac: buy a new Mac or get Apple's Power Macintosh Upgrade Card.

Owners of the 33MHz Quadra 650, 800, and 950 should definitely get the card, while owners of the 25MHz Centris 650, Quadra 610, Quadra 700, and Quadra 900 will have to decide whether saving money (buying an Apple upgrade card) or getting maximum speed (buying a new Power Mac) is their top priority. And keep in mind that the Power Mac Upgrade Card will work with a CPU booster, doubling the speed of the boosted 040 Mac for even better performance.

Everyone else whose system performance is no longer adequate should get a new system, either a NuBus Power Mac now or a PCI Power Mac later. To save money, you can buy a Power Mac 6100 or 7100 and add a CPU booster and a 256K cache card to get 8100/80-like performance for less than an 8100 would cost.

The choices for upgrading a Mac have not been so stark since 1987, when Apple began developing different types of Macs and selling them simultaneously. It took dramatic price reductions and a commitment to consistency in core designs, like that of the motherboard, to simplify the Mac upgrade equation. Ironically, by making accelerator cards cost-ineffective and making new system purchases affordable, Apple has made Macs more like PCs, whose owners have long had the same basic options.

This breaks the old cycle of scrimping for an expensive Mac, buying it, and holding onto it for five years as better models come out while you scrimp for a replacement.

Affordable Power Macs may have hurt the accelerator industry, but they stand to benefit almost everyone else. And they all but ensure that Apple's goal of transferring its active users to Power Macintosh will be a reality. After all, there's little reason to stay behind any more. ■

GALEN GRUMAN is a *Macworld* executive editor who covers system-level technologies and new Macs, including Power Macintosh.

Next month: Look for our feature on Power Macintosh applications

SYSTEM UPGRADES

MW EDITORS' CHOICE

To determine the best system-acceleration products, *Macworld* gauged performance, price, and compatibility. It quickly became apparent that only Power Mac options made economic and performance sense.

Power Macintosh Upgrade Card For owners of a Quadra 650, 800, or 950, this is the least-expensive choice. Plus it offers Power Mac 7100/66 performance. **Company:** Apple Computer. **Company's estimated price:** $699

Power Macintosh 6100/60 with CPU booster and cache card Combining this inexpensive Power Mac with the Newer Technology PowerClip CPU booster and a 256K cache card offers a system that has near-8100/80 performance at a lower price. **Companies:** Apple Computer, Newer Technology. **Prices:** $1819 for the Power Mac 6100/60 (company's estimated price for a base system with 8MB of RAM), $245 for the PowerClip, and about $200 for a 256K cache card.

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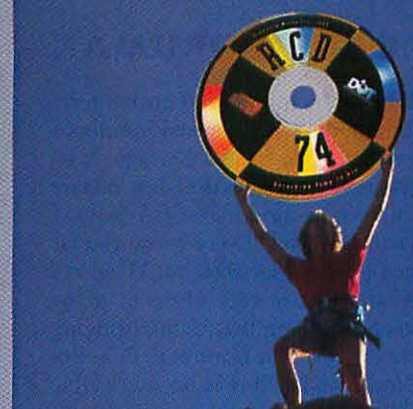

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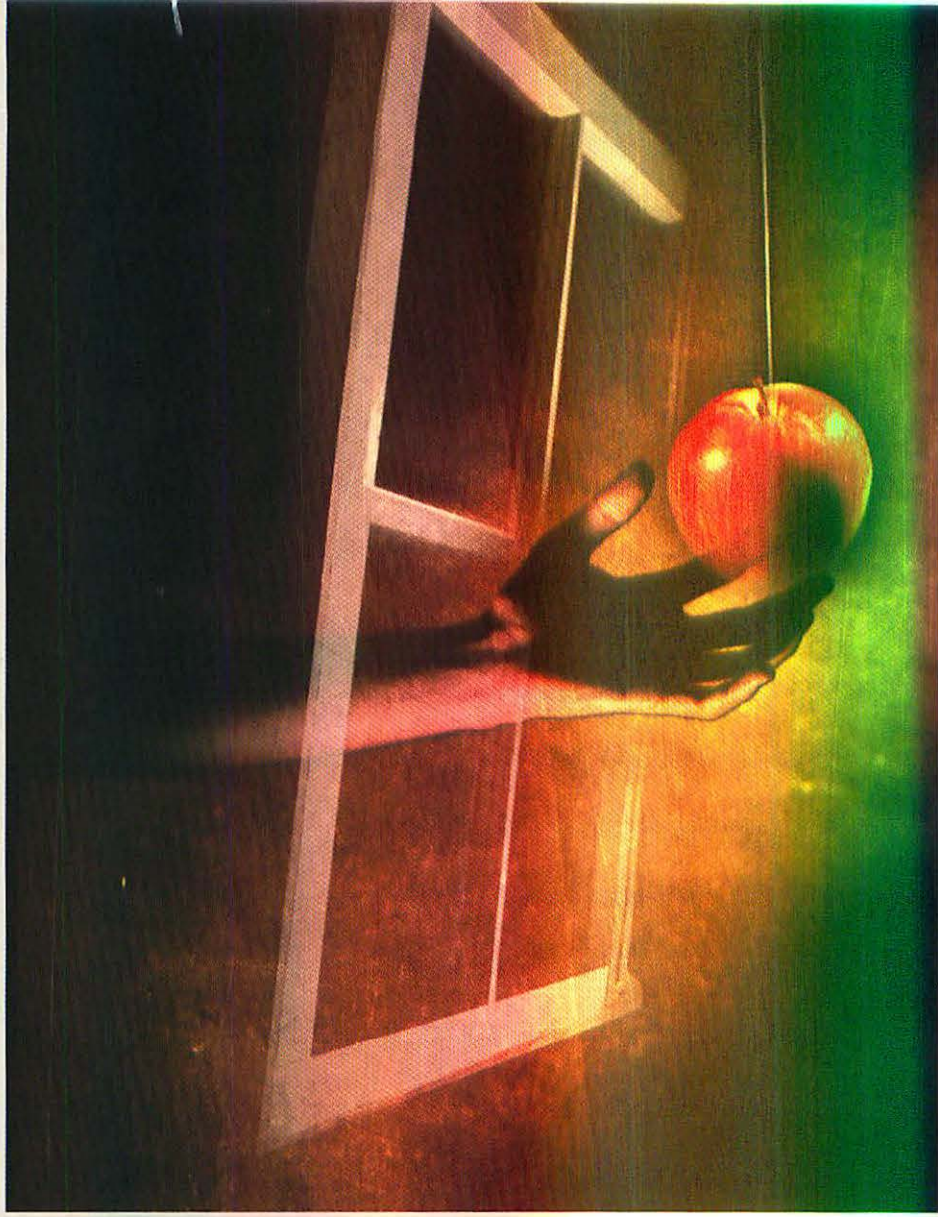


THE NEW WINDOWS

BY GALEN GRUMAN

For the past six months, PC users have been inundated with information about Windows 95, code-named Chicago. Article after article describes the latest version of the nine-year-old Microsoft Windows as "Macintosh-like." Every version so far has been labeled Mac-like, but Windows 95 actually comes very close in many respects to fulfilling that claim, bringing many of the best Mac features to PCs. But make no mistake, this is no mere Mac clone. It borrows from many sources, including IBM's technically innovative but ungainly OS/2. The interface, though, is modeled on the Mac's, but embellished with the high-tech look of Microsoft's Office interface, which Mac owners will recognize from Word 6.0, Excel 5.0, and PowerPoint 4.0.

The new Windows offers plug-and-play capabilities (although only hardware designed to work with it matches the Mac's level of plug-and-play) and built-in networking and telephony. Gone is the division between Program Manager and File Manager—you can choose to use Mac-like folders or hierarchical menus. Gone is DOS, although you can still use DOS commands to quickly do tasks that are time-consuming with a graphical interface, like renaming multiple files.

All in all, Windows 95 poses a serious challenge to the Macintosh. Its graphical interface is good—in some areas better than the Mac's, in some equal, and in others not as good. But Windows is no longer a wannabe. For most people, Windows 95 will be as good as the Mac, though different, and that's a fundamental problem Apple must face soon.

Touring Chicago

Although thousands of testers received beta copies of Windows 95, Microsoft has restricted the availability of current betas to the press—and insists that publications working with older, authorized betas not reveal their performance or compatibility findings. With *Macworld*, Microsoft officials expressed concern that Windows 95 might be compared with System 7.5. The screen shot "Welcome to Chicago" highlights the basic Windows 95 interface as implemented in an early prerelease version. Microsoft says that few interface details will change in the final version. The delay in releasing Windows 95—now scheduled for May or June—is due to the need to iron out compatibility with the great expanse of PC hardware and software, Microsoft says.

It's easy to see the Mac ancestry in Windows 95. The Start button, with its pop-up menu, compares to the Apple menu on the Mac. Start includes several features familiar to System 7.5 users, including hierarchical menus and lists of recently used programs and documents. The row of open folders and programs at the bottom of the screen (called the Task Bar) corresponds to the program menu in the Mac's upper-right-hand corner. But the Task Bar is visible at all times, showing both folders and programs. That makes moving around the system very easy. Plus, Windows 95 lets you position the Task Bar at the left, right, top, or bottom of your screen.

You can also see Mac-like folders and control how the system displays each folder's contents: by large icon, by name, with details on type and size, sorted by date or name, and so on. Just like the Mac. Windows adds a neat feature to this scheme, however: you can opt to have subfolders open right on top of the folders that contain them, avoiding the explo-

sion of folders that cover the Mac screen.

Windows 95 puts icons on the desktop for servers and drives—another Microsoft improvement on a Mac idea. Users on networks have two icons that represent navigation tools. My Computer opens to display icons for all drives (hard, floppy, CD-ROM, and so on), any of which you can click to open a list of folders; Network Neighborhood lets you navigate all computers and devices that you are networked to. Programs compatible with Microsoft's MAPI (Messaging Application Program Interface) protocol give you a window containing all your E-mail, voice mail, or fax messages.

Two other tools help you wend your way through your system. Explorer lets you navigate the contents of a drive or folder hierarchically, much as you move through folders in the Mac's list view. The other is the Search facility, which lets you find programs and files through a series of attributes—again, similar to the System 7.5 Find facility. Most users will probably settle on one or two search methods that they prefer. But it's nice not to be constrained by the system designers' dictates. The screen shot "Welcome to Chicago" shows these navigation tools.

A third area where Windows 95 and the Mac have traits in common is in active assistance. System 7.5's Apple Guide helps you learn operations; Windows 95 uses Wizards—those semi-interactive macros that Word, PowerPoint, and Excel sport to automate complex tasks. Microsoft's Wizards in fact came first but were used for advice-oriented help rather than semiautomation. Apple then used them to lead users through operating-system operations. Microsoft now returns the compliment by using Wizards to hold users' hands through operating-system tasks, such as installing printers (see the screen shot "Instant Information").

Windows 95 differs from the Mac in its control over system resources. Mac owners have long wondered why PCs use mice with two or more buttons. With Windows 95, there's an answer that they can understand. If an item—whether a program, file, control panel, disk, or server—is selected and you click the right-hand mouse button, a pop-up menu appears. From this menu, you select common operations available for the item, such as deleting it, making a shortcut (like an alias on the Mac), copying it, or if it's a folder, changing how its contents appear (as icons or a list). You can also look at the item's properties, an OS/2-like feature that lets you see or modify characteristics of the item. For example, you can modify the icon, change the shortcut reference, make a file read-only, or rename a drive. In some cases, such as for drives, you can also see graphically how much free space there is. These modifications are comparable to operations from the Mac's Finder's File menu and Get Info dialog box, except that properties function on any kind of object—potentially very handy. The screen shot "Instant Information" shows three property sheets.

Another difference in Windows is the use of tabbed folders (as in the latest versions of Word and Excel for the Mac) to organize properties and settings. This lets Microsoft and third-party developers add a lot of controls and preferences to their software without creating overly crowded dialog boxes and menu lists.

Surface and Substance

Many changes in Windows 95 are cosmetic. For example, the controls to resize windows have been changed from unintuitive triangles to shapes that mimic what actually happens to the window. At the upper-right corner of the window, the controls minimize (reduce it to an icon in the Task Bar), maximize to full screen, or restore (to the last user-defined size), and close a window. There are also new scroll bars whose scroll-box size is proportional, so you can quickly see how much there is to scroll through—the shorter the scroll box, the longer the scroll.

Other changes are very functional, and here we see some significant points of concern for Apple. In addition to the navigation tools, Windows 95 comes with built-in networking (including remote access, file sharing, and security), built-in

Microsoft intends to snatch the Mac's interface primacy. Can it?

THREAT

telephony (to manage voice, fax, and data lines, including automatic handling of calling-card information), and built-in multimedia capabilities (including motion-video playback, audio recording and playback, and compression). Much of this existed in Windows for Workgroups, a network-client version of Windows that shipped in late fall 1993 (a year or more after Apple introduced similar capabilities), but Windows 95 further refines and integrates them. It is designed for a networked, telecommunicating world. You don't need a special PC model to use these features; any popular network, fax modem, and multimedia bundle (typically a sound card and CD-ROM drive) will do. If there is to be an information superhighway, Windows 95 is ready to run on it.

ALL IN ALL, WINDOWS 95 JUST MAY BE WINDOWS DONE RIGHT

Windows 95 seems to demand as much RAM and disk space as Windows 3.1—or System 7.5. I found the prerelease version to be very responsive on a 33MHz 80486DX-based PC, a Quadra 800–level PC that is now in the low-middle of the PC performance curve. Microsoft is aiming Windows 95 to run respectably on a 25MHz 486SX-based PC with 4MB of RAM, which is the entry-level business PC of a year ago. It's a good bet that Microsoft will succeed: a prerelease version's performance is almost always slower than the final version, and the prerelease of Windows 95 is quite acceptable.

The new Windows retains a few advantages it has long had over the Mac, such as true multitasking (so programs can run simultaneously) and memory protection (so a crashed program usually won't affect other programs).

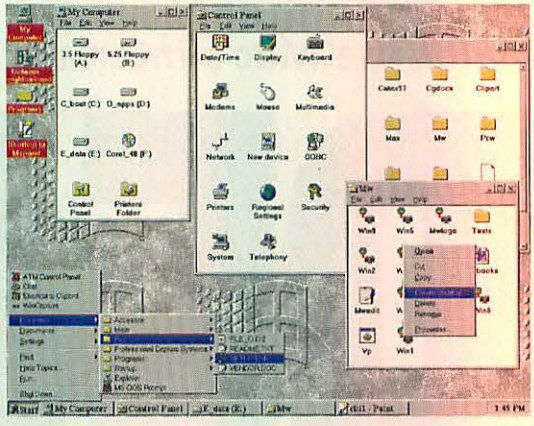
All in all, what Windows 95 offers is Windows done right. Although experienced Windows 3.1 users will take a few days to adjust to the changes in the interface, Windows 95 quickly starts feeling right. Having multiple approaches to dealing with items—from hierarchical pop-up lists, from pop-up menus within folders, from shortcuts, from the Task Bar—is confusing at first, but you soon settle into a way that suits your style. That's nice. Macintosh users in Windows workplaces where Macs are in the minority may wonder whether their employers will continue to maintain mixed-platform environments. (To get a feel for what it's like to switch sides, see the sidebar, "A Mac Owner's Tour of Windows 95.")

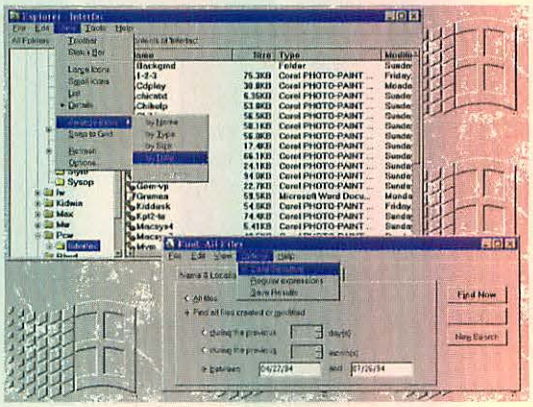
Facing the Windows Challenge

Many software developers are privately disturbed about what lies beneath Windows 95's impressive new interface. They complain about the poor Graphical Device Interface (the QuickDraw equivalent) and that the significant amount of 16-bit code in a purportedly 32-bit operating system limit their ability to exploit the 32-bit features. These developers say schedule slips caused the Windows 95 team to jettison some improvements, such as a 32-bit GDI, already in place in the RISC-based Windows NT 3.5. Still, it's been clear since Windows 3.0 shipped in mid-1990 that Microsoft plans to beat Apple at its own game: making PCs capable but easy for people of varying experience to use. Windows 3.1, released in mid-1992, ended the slowness that marked its previous attempts and made Windows a viable system for most users. Though it took more than six years to get there (Windows 1.0 was released in late 1985), Microsoft finally had a direct challenger to the Mac interface. No longer was it a simple question of easy-to-use Mac versus standard PC, but easy-to-use Mac versus easy-enough-to-use standard PC. Sure, Windows 3.1 was not as user friendly as a Mac, but it was pretty close for most people.

Unfortunately, as Microsoft kept pushing closer to Mac-ness, Apple kept focusing on selling its ease of use against a competitor that was getting easier, not harder, to use. While focusing its marketing on diminishing differences, Apple also did little to redefine ease of use in its system software or to support compelling new capabilities that would make the Mac a must-have for specific groups of users. System 7 added QuickTime, color, and aliases; and Apple introduced the breakthrough Apple Remote Access software at about the same time. But it also added Windows-level memory requirements and poorly or incompletely implemented technologies like publish and subscribe, balloon help, and AppleScript. System 7.5, released this past fall, essentially adds stripped-down versions of popular utilities; little-used PowerTalk communications capabilities from the System 7 Pro version; Apple Guide; and a new imaging model (QuickDraw GX) that adds good printing functions, at the expense of compatibility with many existing programs, and that includes sophisticated graphics capabilities that most third-party developers have already implemented within their programs and don't want to rewrite.

Meanwhile, Apple undercut its own AV technology by implementing it on the short-lived AV Quadras and Centrises using special digital signal processor chips. Apple and developers alike knew that the AV-capable Power Macs were only a few months away, so practically no one took advantage of the AV Macs' audiovisual processing capabilities.





Welcome to Chicago Top left: A mix of Mac-like features for displaying folders and files and OS/2-like features for getting information on items characterize the look and feel of Windows 95. Unlike changes to the Mac's latest System, 7.5, the additions to Windows feel better integrated, and unlike the latest OS/2, Windows doesn't add unnecessary complexity to accessing the item information. Left: Windows 95 provides several ways to find information on your PC and on the network, including a hierarchical Explorer and a Search facility.

A MAC OWNER'S TOUR OF WINDOWS 95

COMPARED WITH WINDOWS 3.1, THE FORTHCOMING WINDOWS 95 LOOKS TO BE AN IMPROVEMENT. BUT DOES WINDOWS 95 MATCH THE MAC'S LONGSTANDING EASE OF USE? I ASKED FIVE *MACWORLD* EDITORIAL STAFF MEMBERS FAMILIAR WITH THE MAC BUT NOT WITH WINDOWS TO FIND OUT.

Look and Feel The harshest judgment belonged to administrative assistant Matthew Hawn: "The Windows implementation feels clunky and very toylike, similar to the pre–System 7 Mac interface." But most testers felt that Windows 95's arrangement was somewhat complex, unsophisticated, or imposing. Once inside a program, however, the testers became comfortable, perhaps because so many programs have identical Windows and Mac versions. After using Windows 95 repeatedly, the testers warmed up a little to its look and feel, although no one found the interface to be as organic as the Mac's. "The interface seems heavier and less elegant in look and feel, but I think I could get used to that," said copy editor Jacqueline Kan.

Most liked the new Task Bar, which contains the names of all open programs and folders. Assistant editor Joanna Pearlstein's comment was typical: "I liked having the names of open folders and programs at the bottom of the screen."

A few Windows 3.1 holdovers frustrated some testers. For example, although he intuited the window-restoration and maximizing features based on the icons, Macworld Online assistant editor Paul Devine was still unclear on the ability to turn a window into an icon (called minimizing, something the Mac doesn't do). He missed having the ability to move document windows anywhere on the screen (in Windows all appear within the program's window): "It would drive me crazy to have to work with all the windows from one app in one location." But Devine admired the keyboard shortcuts built into every menu command and most dialog-box buttons.

Ease of Navigation For years Mac owners have pooh-poohed DOS and Windows' navigation methods. And despite Microsoft's addition of Mac-like folders, the *Macworld* testers still found navigation difficult. "Chicago's file management was confusing. I had trouble visualizing exactly what was on the hard drive and where," said Pearlstein.

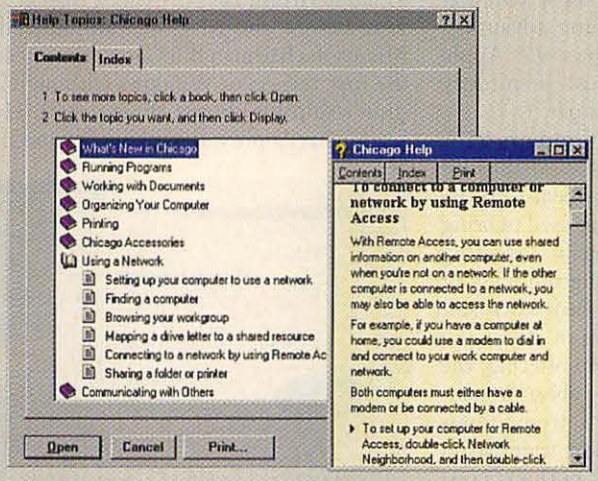
Windows 95 has several methods for navigating the operating system, and that bothered testers, who expected just one. But Hawn found that the most complex method, the Explorer, was "at first kind of disorienting, but I got to like it pretty fast. But I hate file directories and the way it handles file organization." Several testers never discovered some of the Explorer's more powerful features, like sorting the contents of a folder.

Access to Features To aid new users, access to all programs is in one place, which our testers liked. Pearlstein said, "The Start button was cool—it helped me figure out where to go." Editorial production manager Jeff Sacilotto was surprised by the extent of its functions: "The Start button on the Task Bar threw me for a loop at first glance. I was expecting to see only restart/boot functions there, but it's the launcher for everything."

When you press the right-hand mouse button, context-sensitive menus pop up at the pointer location and show options appropriate for the selected item. But all the testers found these menus confusing. (Microsoft says they're shortcuts meant for experienced users.)

A new help system features several coexisting types. That too threw some testers. "I only liked the one that displayed the help text in a window that let the elements below it show through its shadow for a more real-dimensional experience. But the best part was the hypertext links to related topics," said Sacilotto.

Pearlstein and Kan both wanted to know how to delete a file (you press the Delete key or click the right-hand mouse button to get a contextual menu). Microsoft's own testers had the same question, and Microsoft plans to add a wastebasket icon in the final version.



Mixed Reaction to Help Windows 95's help system daunted some testers and impressed others with its wide support for third-party products.

Configuration Our testers found it easy to configure Windows 95. Too easy—they were able to install drivers for nonexistent components, and when Windows 95 detected a problem during start-up later, it could not recover. As with the Mac, you can use shortcut keys to bypass such problems, but the testers expected more active recovery in such cases. "You had to know all kinds of information about cards and driver files. AppleTalk seems much simpler," said Devine. (Windows 95 will approach such simple installation only with devices that conform to the new Plug and Play hardware specification it codeveloped with several other companies, including Intel.) But Sacilotto admired the number of help and configuration files for non-Microsoft products: "This gave me a sense of confidence that if I chose a printer, CD-ROM, or whatever from the list of supported devices, I would be likely to have relatively quick success. It seems that with the Mac, if Apple didn't produce it, you're on your own."

Microsoft is aiming Windows 95 primarily at two groups of users—experienced Windows users and newcomers to computing. While Windows 95 will likely grow on current Windows users, novices may still find the Mac more compelling and easier to grasp.

Worse, Apple shipped the AV Macs with several limitations in both video and audio capabilities—limitations that still exist today. (For example, the promised building blocks for telephony control don't yet exist, and the sound-recognition software is crude. Products from Apple, such as a monitor-mounted camera for videoconferencing, quietly never materialized after Apple's initial announcements.)

And most recently, Apple shipped superbly fast Power Macs that don't do anything a Quadra can't do. The additional speed is nice, but where is the fantastic new world of capabilities that this speed was supposed to inaugurate? Even Apple and its Claris subsidiary have done nothing to make the Power Macs uniquely powerful, the way the original Macintosh was compared with the original IBM PC.

THE MAC HAS REMAINED FAIRLY STATIC WHILE WINDOWS PUSHED AHEAD

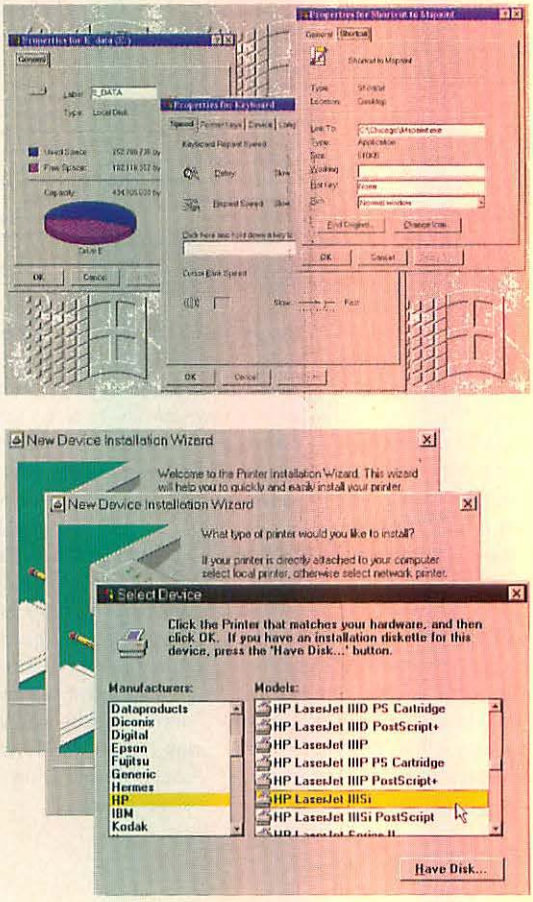
All this leaves Apple in the position today of having an operating system that does not offer a compelling advantage over Microsoft's Windows 95. Apple needs to put the Macintosh manifestly ahead of Windows, not on par.

Apple's response to Windows 95 is something code-named Copland, the next version of the operating system—probably System 8—which is supposed to bring the Mac to the next step, again surpassing Windows. Apple is keeping mum about Copland, saying it doesn't want Microsoft to copy Copland's features in Windows. Whatever Copland ends up offering, the system is not due out for about a year, which gives Microsoft a tremendous advantage in blocking new users from choosing Macintosh and perhaps convincing some cross-platform organizations to drop the Mac and consolidate on Windows. If people flock to Windows 95 (and despite Apple's statements to the contrary, I believe the Windows community will), that will underscore the need for developers to focus their efforts on Windows. Already, most major developers put the larger Windows market ahead of the Mac market. If the Windows market explodes in a frenzy of Windows 95 upgrades, the Mac will move out of the backseat and into the trunk. By the time Copland is ready, Microsoft hopes to have its Windows 95 replacement—code-named Cairo—available. Microsoft typically ships a couple of years late, so I won't hold my breath, but Microsoft is not about to stop. Details on Copland and Cairo are sketchy, but Microsoft clearly has no intention of letting Apple surpass it.

Apple and many Mac owners often self-righteously chide Microsoft for copying the Mac, but this self-congratulation has let the Macintosh stay fairly static while Microsoft has pushed ahead. It makes no difference that Microsoft uses good ideas developed elsewhere, rather than developing fundamental innovations itself. (In fact, Apple and everyone else uses the same research community as its wellspring. What Microsoft does differently is let other companies try out ideas on the market to see how well users accept them.) Wherever the ideas in Windows 95 come from, they threaten Apple. A year before the Mac was announced, Microsoft chairman Bill Gates announced the first version of Windows (although it didn't ship for almost three years). He knew what Apple was working on, and he was a believer. And he was shrewd enough to devise a strategy to change the PC market from DOS to Windows, all without losing control of the market. Apple spent its energies fighting Microsoft on the legal front and exploring innovative technologies, but it didn't integrate those technologies in a unified package, nor did it advance the interface design significantly past what the original System delivered. The Mac interface of today bears a very strong resemblance to that of a decade ago. What once looked advanced now looks almost historical.

Microsoft also exploited its knowledge of Windows (some say unfairly) to develop versions of Word and Excel for Windows (both based on the Mac versions, incidentally) that soon knocked the top competitors out of the market. Today, WordPerfect is a distant second in the Windows word processing market, and Lotus 1-2-3 is a distant second in the Windows spreadsheet market. They may rule the DOS markets still, but these are dead-end markets.

By contrast, Apple has done next to nothing to exploit the strengths of its operating system. Whether it's AppleScript, AV, publish and subscribe, Data Access Language, Power Macintosh, or even QuickTime, Apple has left it to third parties to find significant advantages to using innovative Apple technologies. Claris has proved to be no help in taking advantage of new Mac technologies. Most Mac developers are busy selling to the three-times-larger Windows market, and they're not about to make their software substantially different on the two platforms. If they do, chances are the bigger market—Windows—will get most innovations. That puts the burden on Apple to create compelling, unique uses for the Mac so there's a tangible reason to select Mac over Windows. We're still waiting. Let's hope the wait ends soon, before we find ourselves running a computer with no smiling face to greet us. ■



Instant Information Top right: By putting information in property sheets—sophisticated versions of the Mac's Get Info dialog boxes—Windows 95 lets you learn about and modify settings for items. Right: Windows 95 employs Wizards to automate much of the hassle of installing software drivers and changing system settings.

GALEN GRUMAN is a *Macworld* executive editor who has covered personal computing and computer technology issues since the 1980s.

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Macworld

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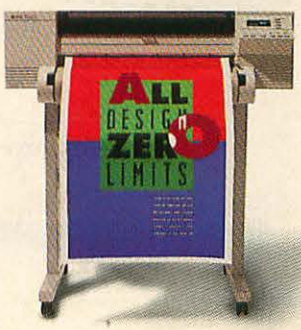

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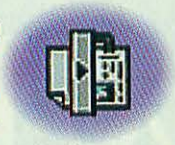

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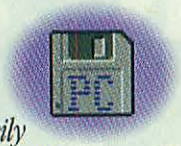

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EMPLOYEE EVALUATION

NAME: Chris Wolfe **DATE PREPARED:** 9-8-94

TITLE: Product Manager

DEPARTMENT: Account Management

OVERALL PERFORMANCE:

☒ **Outstanding** ☐ **Commendable** ☐ **Satisfactory** ☐ **Needs Improvement**

COMMENTS:

Chris has become an indispensable member of the account team. He has demonstrated a high level of motivation and enthusiasm for the job. Perhaps the most compelling evidence of this can be found in his ability to work independently, where he picks up new tasks easily with little need for supervision or instruction. He consistently recognizes and works around obstacles to maintain productivity. Consequently, he often completes assignments ahead of schedule. At a time when collaboration is more critical than ever, Chris has also proven to be an excellent team player. He works effectively with coworkers on projects where teamwork is essential, and can easily motivate and inspire others to achieve. When delegating tasks, his thoughts are well organized and his ideas clearly articulated – an indication of his excellent communication skills. His projects are all distinguished by an attention to detail. His conclusions are always sound and logical. And he excels in time management, effectively compiling and analyzing information. He always manages to work efficiently, setting an example for effort throughout the company. Promotion and appropriate compensation are recommended at this time.

Chris Wolfe
Employee's Signature

Evaluator's Signature

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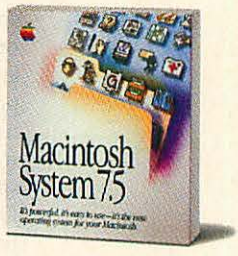

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INNOVATIVE IMAGE EDI

Photoshop 3.0, Live Picture, and others redefine the professional landscape

by Deke McClelland

FOR YEARS THERE'S BEEN ONLY ONE PROGRAM FOR anyone serious about image manipulation: Adobe Photoshop. But these days, new image-editing applications—HSC Software's Live Picture, Specular International's Collage, and MacEurope Information Systems' Imagician, as well as the latest version of Photoshop—are introducing highly promising, alternative ways to manipulate graphics files. As a result, the way you edit images on a Mac is about to change (if it hasn't already)—even if you stay firmly ensconced in Photoshop.

Specifically, three major developments are changing the image processing landscape: layering, hardware-based speed improvements, and proxies (screen representations of actual images). Layers enable you to edit and composite independent foreground and background images within a single document. Hardware-based speed enhancements include specific support for the PowerPC chip, DSP acceleration, and Imagician's proprietary RAM cache board. And proxies both speed up the editing process and enable you to apply as many adjustments as you want without adversely affecting image quality. Sadly, proxies are not a feature in Photoshop.

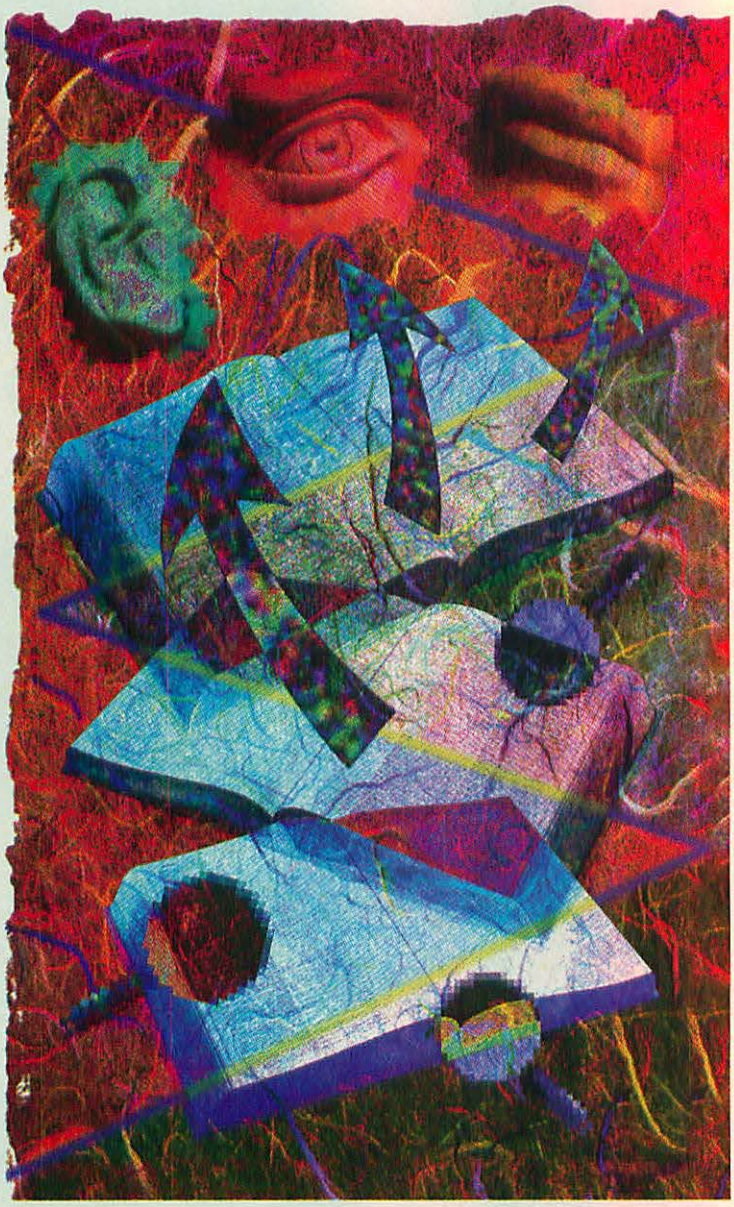
For this article, I worked with Photoshop 3.0 (Adobe Systems, $895, 415/961-4400), Live Picture 1.5 (HSC Software, $3995, 805/566-6200), Collage 2.0 (Specular International, $399, 413/253-3100), and Imagician 2.14 (MacEurope, $3995, 408/454-0239) to see how they compare in each of those three important areas. One additional program, xRes (Fauve Software, $799, 919/380-9933), purports to challenge Live Picture for less than one-fourth the cost (see *Graphics* news, October 1994). Unfortunately, xRes was not available for review—even in a prerelease version—at press time. In addition, Macworld Lab timed the four programs in operations that they all perform—rotating, sharpening, blurring, and so on—to see how they stack up in sheer computational power. (We tested both 680X0 and native Power Mac systems both versions were available.)

MW LAB

The Layered Look

The most important enhancement built into the new generation of image editors is the ability to work with layers. By allowing you to edit bits and pieces of images independently, layers let you make additional adjustments to a single foreground or background detail—days, weeks, or even years into the image-editing process. You can change the layering order, introduce new layers or delete existing ones, and change the way different layers blend together at absolutely any stage in the game (see "The Multiple Benefits of Layers"). In fact, layers are

TORS



Photoshop 3.0 This image, produced entirely in Photoshop 3.0 by San Francisco Bay Area artist Diane Fenster for Apple's *Develop* magazine, consists of seven layers: the background, the zigzag line, the books (each on its own layer), the magnifying glasses and arrows, and finally, the ear, eye, and mouth (all on the same layer). The books, the arrows, and the magnifying glasses were all composited in Difference mode. The zigzag line was a stroked path that Fenster airbrushed in Dissolve mode. The background was a scanned sheet of Japanese rice paper. The eye, the ear, and the mouth came from separate Photo CD files, which Fenster blended one at a time with the background (using two layers). She applied the Mosaic filter to pixelate selected areas of the edges.

likely to change the way most of us think about editing digital photos: you're no longer editing a single image, you're editing multiple images that happen to coexist inside a single canvas. Of the four image editors I evaluated, Collage was the first to introduce layers, but all four offer some variation on the function.

Collage and Imagician The layering functions in Collage and Imagician are rudimentary, permitting you to transform a floating image, filter it, and send it backward and forward in stacking order. In either program, if you want to filter or display only a portion of an image, you have to mask it.

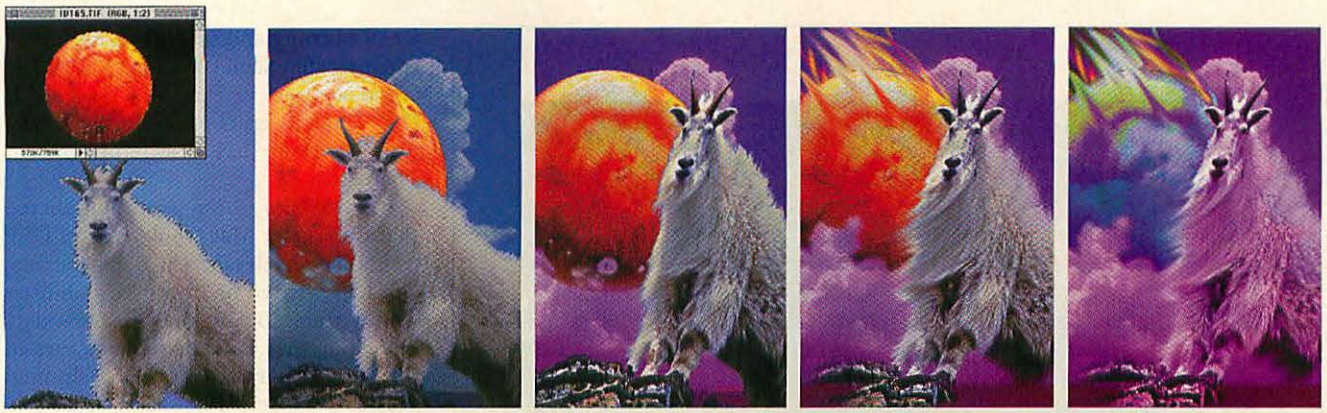
Collage evaluates masks in the conventional fashion, by reading in a fourth channel of gray-scale data, but you can't generate or edit a mask inside the application. Conversely, Imagician allows you to create and edit a mask, but it evaluates this data differently than do Collage, Photoshop, or Live Picture. First, the mask permits one bit of data only. As a result, each pixel in the mask must be either black or white, thereby prohibiting antialiasing or feathering. And to determine the mask, Imagician reads the first bit of data rather than the last eight bits—thus, it doesn't support masks created in other programs.

Live Picture In Live Picture, layers serve multiple purposes. Not only can you manipulate the contents of the layers independently, you can also mix layers and use them to assign effects. To reveal background layers, you can apply one mask and one stencil to each foreground layer. You can smear, paint, and erase the mask, but you can edit a stencil solely with the path tool. (A stencil in Live Picture is a resolution-independent masking outline that serves the same function as a clipping path in a draw program.)

Things become a bit laborious when you start to use Live Picture's painting and effects layers. If you want to add brushstrokes to an image, you must create one of three types of additional layers, each of which serves a very specific function. One layer lets you paint in a single hue; another enables you to paint in full color; and the third is for applying predefined op-art effects of dubious merit, such as wood patterns and oil-on-water reflections. To sharpen a portion of a layer, you create a new layer immediately above it to contain the sharpening effect. Likewise, to distort, color-correct, or clone an image, you must create a separate layer for each effect.

The advantage of Live Picture's layering system is that you can selectively adjust effects by erasing, painting, and filling. You can also apply multiple distinct effects on top of each other. For example, if you aren't satisfied with the maximum application of a Sharpen/Blur layer, you can throw yet another Sharpen/Blur layer on top of it.

Unfortunately, you have to add layer upon layer to achieve effects you take for granted in all the other programs. You have no numerical control over the radius or threshold of sharpening or blurring effects. The color-correction layer is sufficiently selective to map one range of colors to another range but insufficiently selective to map blacks, whites, and grays



The Multiple Benefits of Layers Layers enable you to select or mask distinct images, such as the planet and mountain goat in the first image (far left), combine them with other images, and edit the layers individually. I used Photoshop to create the effects shown here, since it's the only program that can do all these steps.

In the second image, I composited the planet and goat against a new background by adding another layer, but I could have achieved the same effect by preparing masks for use in Collage, creating hard-edged masks in Imagician, or using Live Picture's silhouetting feature.

In the third image, I shifted the colors in the background, applied several filters to the planet, and skewed and sharpened the goat. (Neither Collage nor Imagician can adjust colors in an image.)

With Photoshop and to a lesser extent, Live Picture, you can use paint and edit tools to mix layers manually, as I did in the fourth image. In the final image, I mixed layers automatically using overlay modes, a capability also provided by Collage. (Original images from PhotoDisc library.)

separately (as permitted by, say, Photoshop's Levels command). Additionally frustrating is the fact that you cannot filter or retouch the contents of individual color channels. Each Image Clone layer duplicates an image from a single reference point only, so to clone from multiple references, you have to create multiple layers.

Keep in mind that each layer further complicates your image and incrementally slows down Live Picture's processing time. (For example, I was able to edit a 4-layer image in real time but experienced 2-to-4-second delays with a 16-layer image.) Except for transformations, you can edit only the topmost visible layer in the image. To edit brushstrokes and effects on a lower layer, you have to deactivate, and thereby hide, all layers above it. By deregulating Live Picture's layering scheme and permitting more operations to occur on a single layer, HSC would make the product more flexible and more applicable to the needs of professional users.

Photoshop The latest Photoshop takes a different and arguably more useful approach to layers. Though its methods for selectively undoing alterations made to layers are more limiting than those provided by Live Picture, Photoshop's methods for editing and enhancing layers are more flexible.

You can edit any layer, for instance, whether other layers obscure it or not. And you can edit a single channel in a layer and mix layers using sophisticated channel operations (many of which are also available inside Collage). These operations can be changed at any time without any destructive impact on the contents of each layer. What's more, you can use various tools to mix the contents of layers by smearing, blurring, and sharpening them into each other. Unlike Live Picture, which smears the mask to merge layers, Photoshop can shift pixels in the layers themselves. And Photoshop offers additional masking options. Each layer includes its own *transparency mask*, a powerful and intuitive function that most folks will use without thinking twice. This mask automatically determines which portions of a layer are opaque, transparent, and translucent. Similar to a Live Picture mask, a Photoshop *layer mask* lets you control the way its associated layer blends with the layers underneath it. Also, you can use one layer to mask another—great for painting images onto other images without straying outside the lines. Considering you also have access to standard selection tools—missing from the other three programs—Photoshop's masking controls can't be beat.

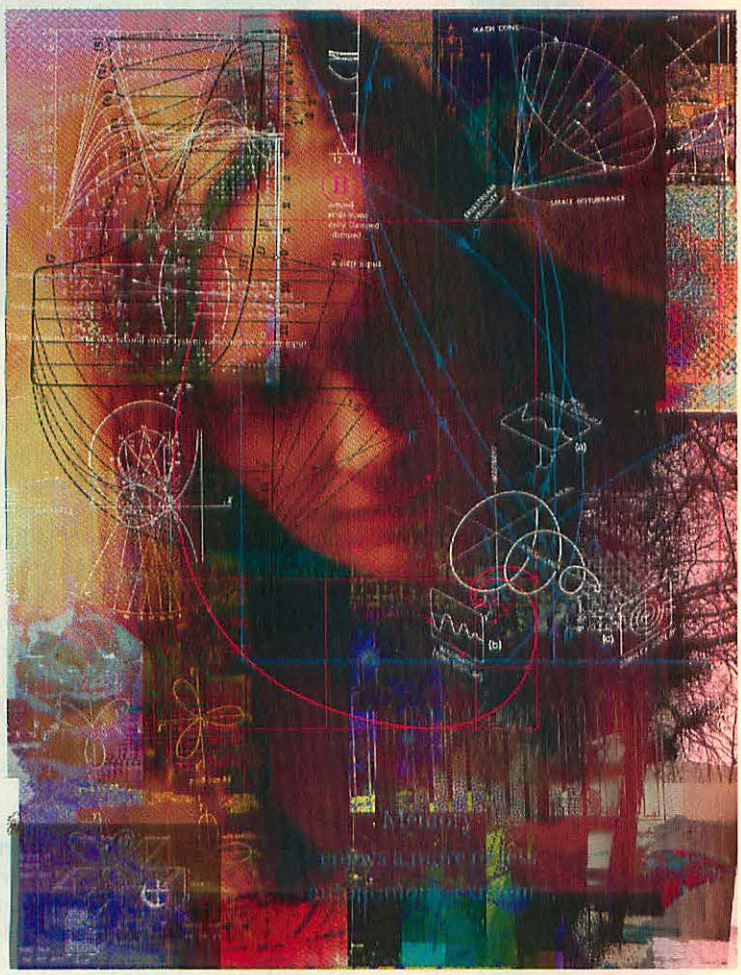
One regrettable problem with Photoshop's layering scheme is that you can't transform multiple layers simultaneously, except by moving several entire layers or by flipping or rotating an entire document. By contrast, Live Picture lets you rotate multiple layers, skew them, and so on. And while you can't edit pixels in more than one layer at a time in Live Picture, an effects layer applies to all layers underneath it. If you want to limit the area of an effect, you can mask the effects layer, even duplicating the mask from another layer.

Also, because Photoshop offers no proxy scheme, its layers can take a severe toll on performance. Each layer added to a Live Picture document may slow things down only a fraction of a second, but in Photoshop adding a layer can make several seconds' or even minutes' difference, particularly if the new layer increases the size of a document so it no longer fits in memory. As long as you're careful to work within your means and don't pile on the layers willy-nilly, Photoshop 3.0 operates as quickly as previous versions. On the other hand, you won't experience such problems in Live Picture, Collage, or Imagician.

Revving the Image-Editing Engine

Power Mac Power Photoshop, Live Picture, and Collage have been updated to take advantage of the PowerPC chip. But don't expect the programs to respond to every single operation you throw at them without occasional delays. Even the proxy-based Live Picture and Collage keep you waiting when they convert or import images. Macworld Lab tests show that a Power Mac 7100 exhibited less-significant speed improvements over a 68040-based Quadra 800 when disk access (such as for importing or converting an image) was involved. Photoshop 3.0 was the tardiest of the bunch; when opening a 200MB four-layer image, Photoshop actually performed 15 percent faster on the Quadra than on the identically equipped Power Mac. (*Macworld* has discovered disk I/O incongruencies that slow down some applications on the Power Mac.)

We saw twofold speed enhancements when operations were carried out mostly or exclusively in RAM, however. Filtering and transformation operations became almost instantaneous in Live Picture when running on a Power Mac, while they took 2 seconds on a Quadra. The biggest Power Mac–induced speed enhancement—nearly threefold—occurred when exporting our four-layer composition to the TIFF format from Live Pic-



Collage 2.0 This image, created by Seattle-based artist Jeff Brice, appears in a promotional brochure for Collage. Brice began by scanning various diagrams and photos he'd taken. After making masks for most of the images, he loaded the images (with their masks) into Collage. Using Collage's low-res proxies, he was able to quickly and easily experiment with different shapes, positions, and sizes, until he found a combination he liked. Collage's Transfer Methods allows him to quickly preview different ways of compositing images. This is especially useful for Brice, since he typically uses many layers—there are about 25 or 30 layers in this image.

He brought the face, the bottom layer, into Collage using the default Copy transfer method, which does not change the image; he added the smaller images around the face in Lighter transfer method. After inverting the diagrams in the image from black to white, Brice composited them in Lighten mode, which made the black surrounding areas disappear. He colorized the blue diagram by placing it in the mask layer and making the RGB layer blue; when he turned on the mask, the diagram became blue (he used the same technique for the red diagram). Once he'd placed all the images in various layers, he repositioned some of the layers to create unexpected effects, such as the diagram in the bottom left, which picked up its yellow color from the photo fragment in the layer above it.

ture. The process took more than 16 minutes on the Quadra 800, compared with just under 6 minutes on a Power Mac. Though disk access is involved when exporting an image from Live Picture, most of the time is spent applying operations to the composition in RAM.

DSP Boards Because Photoshop is the only image editor I tested that applies all operations to every single pixel in the original image, it doesn't begin to keep up with the other programs except when opening and saving flat images or when scrolling and zooming. The delays are so pervasive that an entire category of DSP (digital signal processor) acceleration hardware has grown up around Photoshop.

A year ago, some people predicted that the Power Mac would render DSP technology irrelevant, since the computer's RISC-based processing capabilities would theoretically outpace any data crunching that could possibly be carried through the relatively old-fashioned NuBus port (see "Photoshop Accelerators," *Macworld*, April 1994, for a Macworld Lab comparison of DSP boards). But my informal tests of the only Power Mac–compatible board available at press time, the $1099 Photo Engine from Radius (408/541-6100), suggest dramatic speed improvements. (Actually, the board sneaked into the office at the last possible minute, too late for inclusion in Macworld Lab's tests but just in time for me to play around with it.) Featuring four 66MHz DSP chips, the Photo Engine accelerated the common math-intensive filters Unsharp Mask and Gaussian Blur more than threefold, provided that the image fit entirely in RAM; when Photoshop had to swap data from the hard drive, the speed benefits declined.

For example, with 60MB of RAM allocated to Photoshop, and the Unsharp Mask filter set to an Amount of 200 percent and a Radius of 10.0 (one of my favorite special-effects settings) it took 76 seconds to apply the filter to a 15MB image without the Photo Engine board and 21 seconds with—a nearly fourfold improvement. After I knocked Photoshop down to 16MB of RAM (not enough to hold the image in its entirety), the filter took 118 seconds without the board and 63 seconds with—not even twice as fast. To get the optimum results out of DSPs, then, you also need lots of RAM.

By the time you read this, at least one other Power Mac–compatible DSP board will be available, from Adaptive Solutions (503/690-1236). Scheduled to ship by the end of 1994, the company's PowerShop board ($3995) will provide 64 DSP circuits inside a single chip. As you might imagine, the company claims huge speed improvements, anywhere from 5-fold for filters to 30-fold for RGB-to-CMYK conversions. But the most promising advent for DSPs will be Apple's changeover from NuBus to PCI (Peripheral Component Interconnect)—slated for the next generation of Power Macs, sometime in the middle of 1995. Apple claims the new PCI bus will transfer data four to five times more quickly than NuBus. Sources at Radius, one of the

The Saving Grace of Proxies Unlike Photoshop—which applies your edits to every pixel in the original image—Live Picture, Collage, and Imagician edit a proxy on screen and apply your final changes to the original image during the rendering phase. This makes for a very forgiving environment, in which you can experiment without worry.

The top row of examples above shows the results of applying a series of rotations and resizings to an image in Photoshop; the bottom row shows the same transformations applied in Live Picture. Enlarged details from the point at which the stem meets the apple accompany each example.

The left column shows the original apple: I had to sample it down to 50 percent in Photoshop to make it manageable (top), but I retained full resolution in Live Picture (bottom). At this size, the difference—even in the enlarged details—is subtle. But as I further resized and rotated the image, the degradation became more apparent.

For the record, I scaled the image to 63 percent, rotated it counterclockwise 27 degrees, rotated it clockwise 34 degrees, and scaled it to 129 percent in the middle column. In the right column, I scaled the image to 23 percent, rotated it counterclockwise to 71 degrees, scaled it to 467 percent, and rotated it clockwise 54 degrees.

companies that plans to dive headfirst into the PCI market, expect the speed savings to be more moderate, in the neighborhood of twice as fast, but that's still good news for DSP, since the PCI bus will allow much faster data transfer between the DSP board and the CPU.

Imagician Imagician is a hardware-software package that processes pixels on a dedicated NuBus board equipped with its own 16MB of RAM. Designed primarily to prepare large scans for output or for enhancement in Photoshop, the software is limited to a few transformation and basic-filtering functions. For example, you might use Imagician to rotate and sharpen an image and then export it to a different resolution on disk. Because the operations are handled by the board, 2048-by-2048-pixel images (that's 12MB for RGB and 16MB for CMYK) can be processed and exported to disk instantaneously. When processing larger images, Imagician reads in the most representative 16MB of image data for the screen display. When exporting the image, the program purges the data in RAM and then loads in and writes out the image in 16MB chunks, applying the math along the way. This is the reason that in Macworld Lab tests on a flat (single-layer) 50MB image, Imagician rotated the image in a split second—since it's just changing the proxy in RAM—but took more than 7 minutes to export the file to the TIFF format, because the program had to read and write the file to disk. At present, Imagician is far from a rock-solid piece of software, and the board I looked at was incompatible with the current generation of Power Macs. (Macworld Lab was able to test a Power Mac–compatible board.) But MacEurope has a small and responsive group of programmers (the fix to a bug I found was on my desk three days after I pointed it out) and a program with a promising future. MacEurope plans to bundle its board and integrate its software with Fauve's xRes—a program that promises direct competition with Photoshop, Live Picture, and Fractal Design Painter.

A Vote in Favor of Proxies

A proxy is a stand-in that enables a program to communicate your edits on screen. Rather than applying every edit to the pixels in the original image—as does Photoshop—each of the other three programs uses its own system of proxies to protect the original image from the degenerative results of your edits.

Though the names and sophistication of the proxies vary—HSC, for example, prefers the term *virtual image*—the fact remains that never so much as a single pixel is affected in the original image. Collage relies on a simple 72-ppi proxy, making it difficult to accurately gauge changes made to large images. Imagician intelligently loads the most representative 4 million pixels from your image into the onboard RAM to create a high-resolution proxy. Live Picture's proxy system is based on its proprietary Ivue format. When you convert a TIFF image to Ivue, the program reorganizes the image data for easy access, saving it in full resolution, ¼ resolution, 1/16 resolution, and so on. The program then applies your edits to only the chunk of the screen image that is displayed at any one time. This intelligent proxy system permits you to precisely judge the results of your edits. In fact, Live Picture's display is every bit as accurate as Photoshop's.

A Forgiving Environment Both Imagician and Live Picture do a splendid job of providing you with visual feedback every bit as good as, and arguably better than, the proxyless Photoshop. Collage, on the other hand, leaves you guessing; zooming in on an image, for example, usually provides you with bigger pixels, not greater detail. But regardless of which program you use, proxies make for an incredibly forgiving environment.

As any experienced user knows, one of the first things you have to consider when using Photoshop is the final size at which you want to print the image. When I'm creating a single-column graphic for *Macworld*, for example, I make fast work of reducing the image to 650 pixels wide. There's no sense in wasting time calculating edits on all those other pixels when no one will see them in the finished piece. The downside of this is that once I make this decision, I'm locked into it. If a reader writes me with a request for a poster-size version of the image—as has happened—I have to break the sad news that the entire width of the artwork fits on a 13-inch monitor.

In a proxy-based program, you don't have that problem. You never once have to consider the final resolution of your image until the very last step. Until then, you can juggle multiple high-resolution images, with few if any slumps in performance. You can scale an image down to a small size without sacrificing any pixels and rotate an image as many times as you want without eventually turning it to jelly. In short, you can do whatever you want to the image whenever you want, with no wear and tear on your fragile nerves (see "The Saving Grace of Proxies").

Rendering Collage, Imagician, and Live Picture save your edits in a file, separate from the original image, that takes

Live Picture 1.5.5 For this image, San Francisco photographer John Lund began by scanning several photos into Photoshop. After converting them to Live Picture's Ivue format, he created a new Live Picture file, where he inserted the photo of the Teton mountain range. He inserted the photo of a sunset and sized it to the same width as the previous photo, positioning it so it was overlapping the Tetons. Next he selected the eraser with a very large brush size to get a soft edge, so when he erased the overlapping portion of the sunset image, he would get a smooth transition between the two photos.

After sizing and positioning the waterfall photo, Lund used the eraser again—this time with a medium-size brush—to erase the parts he didn't want, leaving just the waterfall and some of the foreground. With the pen tool, he created a path around the egret; then, converting the path to a stencil with a soft edge set at a minimum feather, he sized it down and positioned it. Going back to the first layer (the Tetons), Lund used the Color Shift command (Layer>Ivue Correction) to change the colors so that the sky in that image would match the sky in the sunset image. He changed the egret's color to match the sunset as well. Next he went back to the sunset layer, duplicated it, and used Color Shift to change the duplicate's colors to blue tones. After erasing the entire duplicate layer using the Erase marquee, he selectively painted the blue image back into the areas of sky between the clouds.

up relatively little room on disk. A handful of compositing and transformation instructions takes up less than 100K. Adding brushstrokes and masks in Live Picture can expand the file to a few thousand kilobytes. When it comes time to proof the image or show it to a client, you must first export it to the TIFF format. This process is roughly equivalent to rendering a three-dimensional drawing, requiring the application of mathematical operations to the original image. It takes only a matter of seconds to render a low-resolution image for proofing. When it comes time to render the real thing, however, you'll probably want to take a coffee break. Live Picture and Imagician rendered our files in anywhere between 4 and 16 minutes, depending on complexity and computer speed (see "Putting Image Processors through Their Paces").

Speed without the Hardware Another benefit to proxies is speed. Because the program doesn't have to apply your changes to every pixel in the original image, it can save time by being selective in applying changes. Imagician is an exception in this case. By applying edits to all pixels in the relatively large 16MB proxy, the program forgoes the speed benefits of proxies and instead derives its speed gains strictly from the accelerated processing capabilities of the NuBus board.

Collage, on the other hand, is an example of proxies in the fast lane. Edits go by quickly when applied to 72-ppi proxies that contain only a fraction of the pixels in the original image. Unfortunately, Collage has to reload the image from disk if you undo a filtering operation. In Macworld Lab tests, for example, loading a 50MB TIFF file into a composition took 90 seconds on a Power Mac 7100; sharpening the image took only 2 seconds. But to undo the sharpening effect took another 90 seconds, because it required loading the original image from disk.

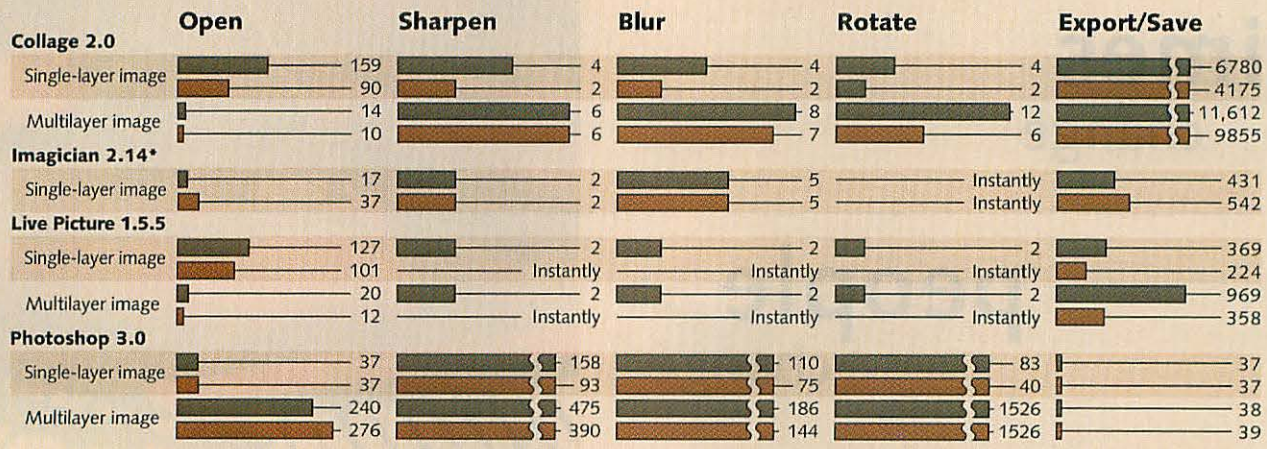
Live Picture handles proxies nearly as well as you can imagine, applying your changes only to the part of each image that is visible on screen. Undo operations fly by in the blink of an eye, which begs the question, Why doesn't the program offer multiple automatic undos? I hope we can look forward to such a feature in future versions.

Resolution Independence A lot has been written about Live Picture's resolution-independent construction. So before I wrap things up, let me eliminate one element of potential confusion. Images converted to the Ivue format and imported into Live Picture have a fixed maximum resolution, just like images opened up in Photoshop. This means you can't import a 72-ppi scan and expect it to spontaneously transform into an infinite-resolution image. But everything else is mathematical, so brushstrokes, text, and paths have no inherent resolution—just like their counterparts in Adobe Illustrator or some other object-oriented program. The same, incidentally, goes for text in Collage. Although you can't edit text in Collage to the same extent as you can in Live Picture, you can scale text without harming its resolution. Both products always work from the outline definitions of the characters.

MW LAB Putting Image Processors through Their Paces

Times are in seconds. Shorter bars are better. Products are listed in alphabetical order.

680X0 software on a Quadra 800
Native software on a Power Mac 7100



*No figures are available for multilayer image because Imagician's layering features were not fully implemented in this version.

BEHIND OUR TESTS

To compare the performance of these professional image-editing applications, we chose operations common to all: opening a file, applying the Sharpen and Blur filters, rotating the image, and exporting to TIFF format. After configuring each application to use the optimum amount of RAM, we first tested each program's handling of a single-layer image—a 50MB 1000-dpi TIFF file. Next we created a multilayer 200MB image from four separate files (each 1000-dpi and 50MB) that we imported into the application as individual layers and saved in that application's native file format. With the single-layer image, we tested the open-file operation by measuring the time required to import the TIFF file into each application, whereas with the layered file, we opened and tested the file in the program's native format. We tested Power Mac–native versions of the software on a Power Mac 7100 with 70MB of RAM; we tested the 680X0 versions on a Quadra 800 with 72MB of RAM. Each machine was equipped with an Apple 24-bit video board as well as two high-speed 1GB hard drives—one for storage and the other for scratch-disk space.

—Macworld Lab testing supervised by Matt Clark

The Last Word

If you were to purchase only one program, it would have to be Photoshop. Despite the program's relative lethargy when editing high-resolution images, and its continued reliance on pixel-by-pixel editing, Photoshop provides more functions than do Collage, Imagician, and Live Picture put together. It is the only program, for example, that lets you both view and edit independent color channels, smear pixels across layers, generate layer masks spontaneously, clean up images using flexible cloning options, apply overlay modes to brushstrokes, and automatically isolate colors outside the CMYK gamut. Furthermore, Photoshop's color-correction, selection, and filtering capabilities are second to none.

For speeding up basic compositing operations, Live Picture is clearly more capable than Collage, but frankly, at $399, Collage provides the better bang for the buck, offering overlay modes, channel-specific filtering, and an interface that most users will take to without so much as a glance at the manual. But professional users will quickly find themselves frustrated by the program's low-resolution proxies and occasional slowdowns.

By contrast, Live Picture is superb at juggling and reflecting changes to high-resolution images. But for $3995, I expect better automated masking controls, more-precise filtering options, the ability to edit any layer while viewing the entire composition, multiple levels of undo, and a more streamlined working environment that doesn't require you to apply a new layer for even the slightest adjustment to an image. However, if you're willing to trade an imperfect working environment for real-time editing, Live Picture is the only show in town.

Imagician has potential and is useful for applying quick transformations to high-resolution scans, but the product is presently too expensive and too unsteady to merit attention from budget-minded users. Imagician may become a viable solution, however, if and when it's bundled with xRes, particularly since xRes is supposed to merge the functionality of Photoshop and Painter with the speed and worry-free working environment of Live Picture—all for the price of Photoshop. Frankly, it sounds too good to be true, but it's refreshing to hear that at least one vendor isn't assuming you'll also be using Photoshop. **m**

DEKE McCLELLAND is a *Macworld* contributing editor and the author of several books about high-end graphics programs. His most recent book is *Macworld Photoshop 3.0 Bible* (IDG Books Worldwide, 1994). He is also the host of "Digital Gurus," a how-to series airing on the MEU and JCN cable television channels. The show includes segments on Specular Collage and Live Picture.

IMAGE EDITORS

MW EDITORS' CHOICE

Live Picture, Specular Collage, and Imagician provide their own unique advantages, and any of the three may prove a valuable addition to your software library. But there's only one image editor you absolutely need.

Adobe Photoshop 3.0 Although it lacks proxies and it continues to perform sluggishly compared with Live Picture and others, Photoshop provides a wealth of capabilities the others don't even touch. **Company:** Adobe Systems. **List price:** $895.

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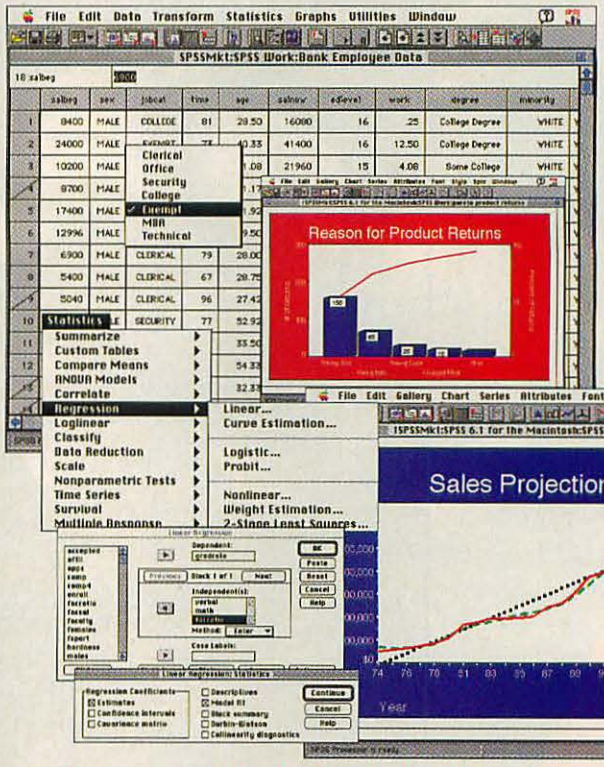

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Safeguard Your Network

PRACTICAL ADVICE ON LOCKING OUT INTERLOPERS

BY JOEL SNYDER

Security has an inherent intrigue, and in the world of computers, network security seems only to multiply the cloak-and-dagger factor. However, the mystery that often shrouds network security makes it seem more intimidating than it needs to be. Security vendors use tales of doom to try to scare companies into buying expensive, complex products. At the same time, network managers fail to take simple steps that could prevent disaster. With a world of bad guys out there waiting to steal your organization's innermost secrets, how can you protect a network and the devices attached to it from intruders?

Rest assured, there are solutions in all sizes for all kinds of problems. The trick is to protect the network without making it cumbersome for users (both local and remote) to do their work. This article provides an overview of software and hardware network-security products to help you accomplish this task.

Keep in mind that network security ranges from low-end issues, like keeping salary figures from prying eyes, to the bigger problem of keeping trade secrets from an aggressive competitor. Different solutions exist for different problems, and you might need to employ several approaches. Product categories looked at in this article include tools for monitoring AppleTalk networks, software and hardware to tighten up security for dial-in users, and software to help network managers keep individual Macs safe. To begin, identify network access points—like System 7 file sharing, Apple Remote Access (ARA) servers, and equipment-maintenance ports—and plan your strategy accordingly.

First Plug System Leaks

System 7 file sharing—a great innovation that lets any Macintosh be a file server—is a potential security risk. A user could turn on file sharing for a file transfer, enable guest access, and forget to turn it off. If there's sensitive data on that Mac's hard disk, it's open for everyone else on the corporate network to see.

ALLEN WALLACE

File sharing's popularity makes it a natural place to start tightening network security. Some network managers go so far as to remove the Sharing Setup control panel from each Macintosh. Rather than take away a valuable tool from all users, a better solution is to educate them about the dangers of unrestricted access and teach them safer ways to use personal file-sharing. For example, help each user set up a share folder with guest access.

MR Mac Software offers Network Security Guard ($259, 619/453-2845), a unique auditing and reporting tool that sniffs at all of the Macintosh file servers in a network and determines what software each is running, which servers offer guest access, and which ones have easy-to-guess passwords. This information gives you a better picture of your network, which you can use to identify and tighten up loose servers. I highly recommend Network Security Guard for almost any network: it fills a real need that no one else does, and it doesn't cost too much.

The AG Group's Nok Nok ($50, 510/937-7900) tackles personal file-sharing by alerting you whenever someone connects to your Mac to access personal file-sharing. usrEZ's ultraSecure ($239, 714/756-5140), a more feature-laden application, offers the same function. If users on your network routinely let others connect to their Macs, consider using one of these packages to let them know who's using what when.

Fortunately, System 7.5 and System 7 Pro are more security-conscious than earlier versions of System 7; they include Apple's Open Collaboration Environment (AOCE), which includes a Key Chain that holds multiple user IDs and passwords, all encrypted until unlocked with a single password by the end user. (For more about AOCE, see "AOCE—Apple's Plan for Groupware," *Macworld*, November 1993.) Unfortunately, though, the individual passwords are still passed around the network in plain text by many network servers once the Key Chain has been unlocked. For anyone worried about electronic eavesdropping, that's a problem. Nevertheless, AOCE's Key Chain can minimize the risk of people writing down passwords or leaving them in accessible Preferences documents. (For more about Apple's approach to encryption, see *The Iconoclast*, in this issue.)

AppleShare Security Options AppleShare can be a particular problem for network administrators because it does not provide the network manager many security options. For example, AppleShare does not attempt to actively protect itself against a break-in attempt. Neither does AppleShare allow the network manager fine control over who can connect to which resources at what times, such as evenings or weekends, or from what locations, such as through ARA.

One alternative is to add products to an AppleShare environment to help maintain security. For example, The AG Group's Nok Nok A/S ($175) adds extensive logging capabilities to any AppleShare server. Nok Nok A/S can also restrict the amount of time that idle, active, and guest users can be connected to the server. It extends the capabilities of AppleShare to identify guest users by their machine names, and it can notify you when someone logs on to AppleShare—if you are near the server and can hear the sound alert or see a dialog box.

Although Nok Nok A/S helps in environments where network managers are constantly monitoring a small number of AppleShare servers, it's far from a comprehensive network-security tool. For much more specific server protection, consider changing file-sharing systems to an AppleTalk Filing Protocol (AFP) system with stronger security, if you can afford the time and money involved.

Network Operating System Alternatives High-end AFP file-server security features include sophisticated access-control lists, such as those provided in Digital Equipment Corporation's Pathworks server (603/884-6660), and time-of-day restrictions, like those in Novell's NetWare for Macintosh (801/429-7000) and Banyan's VINES Option for Macintosh (508/898-1000). Of course, your company's need for additional security should be weighed against the heavy management burden of switching from AppleShare—an easy-to-handle, relatively inexpensive network operating system that runs on a Macintosh—to something much more complex and expensive that requires a different platform.

To compare costs, call the vendors for price quotes based on the number of servers and clients on your network. Then factor in the cost of adding any required hardware platforms and any systems-integration services you might need. If an alternative to AppleShare is already running on your corporate network, adding Macintosh clients to it might be easier than starting from scratch. Some non-Apple file systems, such as Pathworks, provide security features like break-in detection, break-in avoidance, access logging, and disk quotas. If you're serious enough about Macintosh network file-sharing security to need these kinds of controls and are willing to pay the price, replace AppleShare with one of these products.

Four Approaches to Two-Factor Authentication

Company	Phone	Toll-Free Phone	Product	Price*	Token Technique	Works with Voice Applications
Digital Pathways	415/964-0707	800/344-7284	Defender 1000/5000	$560/1 port; chassis starts at $5750/4 ports	challenge-response	○
LeeMah DataCom Security	510/786-0790	800/992-0020	TraqNet + InfoKey/InfoCard	$950/1 port; chassis starts at $2000/8 ports	touch tone	●
Racal Guardata	703/471-0892	800/521-6261	Gateway Security System	starts at $11,055/8 ports	challenge-response	○
Security Dynamics	617/547-7820	○	ACE/Server; SecurID	software starts at $1995, card at $58	time-based	○

● = yes; ○ = no. * *The prices listed assume an allocation of one port per user; the actual cost per user will be less.*

Dial-in Security

The second major line of defense involves the nearly ubiquitous remote users. Anyone with a phone, anywhere in the world, can connect to a network with a modem on it. Consequently, dial-in access to corporate networks calls for serious precautions, whether the modems are attached to mainframe computers or ARA servers.

The first thing to do is make sure that all dial-in access is password protected, and disable guest access to all file servers. That may sound obvious, but organizations have lost millions of dollars by neglecting to put passwords on maintenance ports for routers, switches, and other network equipment—especially voice equipment. If you have any computer equipment connected to the telephone network, there's a risk.

For maintenance ports that are seldom accessed or systems with only a few users, you don't have to invest in an entire security system. IC Engineering has a simple and inexpensive box called the

Modem Security Enforcer (MSE, $300, 410/363-8748). The MSE goes between a modem and another piece of equipment, such as a terminal server or control port on a phone system. Anyone who dials in to the modem gets connected, but users must enter a password before they can actually get through to the device. The MSE is good for small networks because it offers enough security to deter all but the most determined attackers, and it's inexpensive for this kind of product.

The Modem Security Enforcer also offers *dialback* (also called *callback*) security. With dialback, a user dials in to a modem, gets connected, and gives a user identification and a password. Then the security device hangs up the connection and immediately calls the user back, generally at a predetermined number. Dialback is popular, but it's really a poor choice for dial-in security. For one thing, it only really works when a user always dials in from the same location. Also, hackers have developed a technique, called glaring, that fools some kinds of callback systems into thinking they've made a callback when they really haven't.

Mac Software Token	Calculator-Style Token	Other Hardware Token	Encryption
●	●	○	○
○	●	●	○
●	●	○	●
●	●	○	○

One-Time Passwords

If you're looking for a new system, ignore dialback completely and use a *two-factor system* with *one-time passwords*. In a two-factor authentication system, users must provide two different things—for example, a PIN (personal identification number) and a one-time password—to gain access. One-time passwords are just that: good for one time, one user name. True one-time passwords work only once; time-based passwords usually expire in 60 seconds or less.

> Anyone with a phone can connect to a network with a modem on it

With security based on a one-time password, typically you dial in and identify yourself. When the system asks for a password, you give the current one-time password. The password is generated by a calculator-like device called a *token*, by software on the remote user's Mac, or by specialized hardware attached between the remote user's modem and the phone line. While software tokens are easier to use, they can be less secure because they reduce the number of pieces needed to make a secure call. In the first quarter of 1995, CryptoCard (708/459-6500) expects to ship a hardware product, the MB-1 ($249), which will fit in the floppy drive of a Macintosh like a disk, to calculate passwords, lock the Mac until a password is entered, and encrypt data.

In some systems, the token or software calculates the password based on a challenge that the authentication system issues. This type of system doesn't just ask for the password; it provides a number (challenge) for the user to enter into the token, which then computes the correct answer (response).

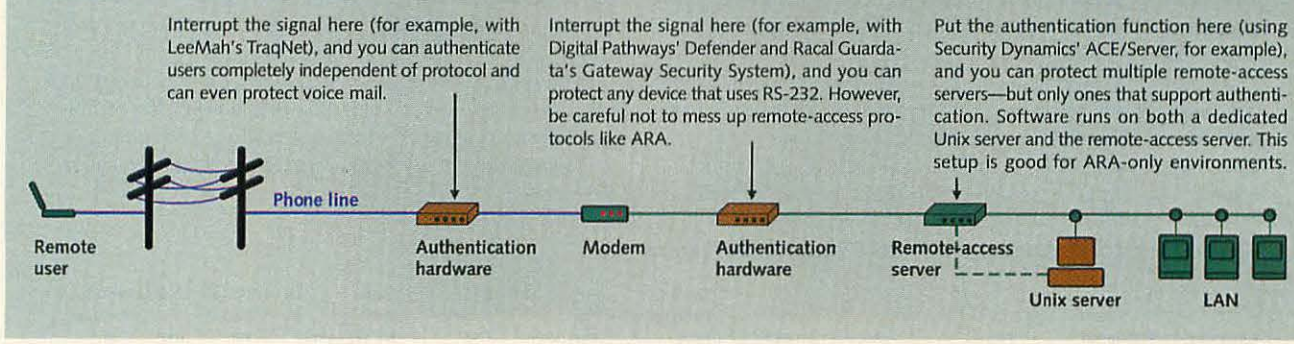
I looked at four approaches to one-time passwords for remote access. Each has benefits and drawbacks. One thing is certain, though: two-factor security is expensive. For 50 to 100 users, expect to pay at least $100 per user. If you want some of the more sophisticated combinations of hardware and software, the price can quickly shoot up to ten times that.

Tokens Plus Modem Interceptors

LeeMah DataCom Security's TraqNet system combines hand-held tokens and special modem interceptors; it's the only system I tested that can protect any kind of telephone-accessible service. The system's pricing starts at $950 for a one-port box; an 8-port chassis starts at $2000. TraqNet's interceptors sit between the telephone line and the server's modem (or voice-mail system). TraqNet intercepts all calls and requires authentication before passing a call on to the modem. Optionally, TraqNet dials back an authenticated user at a preset number.

TraqNet users can use an InfoCard, a token the size of a credit-card calculator, or an InfoKey, a small box that installs between the user's computer and modem. After calling a TraqNet-protected system, an InfoCard user punches two sets of numbers into a touch-tone phone: a PIN and the number the token displays. The InfoKey saves the user the trouble of punching in the number—the InfoKey generates the one-time password and sends it over the line as soon as the TraqNet system answers. TraqNet is easy to install and configure, and the system works great for situations where you want to cut off intruders before they even get a modem carrier signal. Because TraqNet sits between the phone line and the modem, it is protocol-, modem-, and

Authentication: What Works Where



application-independent.

Authentication Plus Encryption The Gateway Security System (GSS, starting from about $11,000 for eight ports) from Racal Guardata combines authentication and encryption systems to protect anything with a serial port, such as a modem; the GSS resides between the server's serial port and its modem.

This challenge-response authentication system uses a calculator-style token, called a WatchWord. The GSS displays a number that the user punches into the WatchWord (along with a PIN); the user replies with the number displayed on the GSS. Users must punch in both the challenge and the response, which can be annoying and works poorly with Apple Remote Access because you can't easily integrate it into a normal ARA log-in sequence. However, Racal Guardata does offer a Mac-resident software token to ease the pain of pressing all those buttons.

The GSS also offers network-level encryption using special hardware at the client end. Users are issued smart cards, which look like credit cards, that have the users' DES encryption keys encoded.

Racal Guardata has built some nice hardware with good engineering. The GSS chassis is solid and secure (it requires two different high-security hardware keys to open it), and the WatchWord token is easy to work with. The software is well designed for businesses with lots of users. For example, the GSS manager can print PINs on special sealed forms (like the ones credit card companies use) automatically for distribution to users. Configuring GSS is easy, although it requires a PC-style keyboard and monitor (since the system is based on an Intel motherboard).

Simpler ARA Access Digital Pathways' Defender products are similar to Racal Guardata's (although encryption is not an option); however, the hardware and software have more rough edges. For example, configuring dial-in menus requires learning Digital Pathways' scripting language, but this language does offer much greater flexibility in programming and configuration. The company's authentication token, which uses challenge-response technology, lacks style—

SOFTWARE TO PROTECT YOUR MAC AT THE DESKTOP

No matter how secure the network itself is, if anyone can walk up to a Macintosh or steal a PowerBook and see all the valuable corporate data inside, you've got a potential problem. I looked at software from three vendors—Kent Marsh Software, Magna, and usrEZ Software—who offer a plethora of similar security features designed to protect Mac systems from an unfriendly world.

Kent Marsh has split up its products—FolderBolt Pro, NightWatch II, CryptoMactic—into easy-to-understand chunks, each of which has an easy-to-use interface.

FolderBolt Pro ($129) locks folders on a single-user Mac's hard disk so that a single password is required for access. With FolderBolt Pro, password-protected folders can be set for write only (commonly called drop folders) and read only (for protection against modification), as well as for no access at all.

Once activated, NightWatch II ($159) requires a password for any further access to the Mac. NightWatch can be kicked on by different events, such as a shutdown or a PowerBook sleep.

CryptoMactic ($99) encrypts data files using ANSI's (American National Standards Institute) DES (data encryption standard) algorithm. When you double-click on a protected file, CryptoMactic asks for a password to decrypt the file.

Magna and usrEZ have taken a kitchen-sink approach to the question of Macintosh security, throwing all of the features that Kent Marsh offers in its three products—and more—into their Empower Remote ($396) and ultraSecure ($239) products, respectively. Of these two vendors, usrEZ is the king of feature creep. usrEZ software reportedly offers 105 features—some of which are useful—making the package only slightly less confusing than Microsoft Word's tool bar. I liked the feature set but found the user interface confusing and nonintuitive. If you need only one or two of the functions, a simpler package from Kent Marsh is a better choice.

All three vendors offer a "fast encryption," which takes less time than DES yet provides a good measure of protection against prying eyes. This is a good feature; it shows a good balance between paranoia and wasted time. Kent Marsh and usrEZ bend over backwards to offer double-DES and triple-DES protection (encrypting the same data with two or three passes and two or three keys), even though this is probably overkill for most users.

A warning: All folder- and application-locking systems that do not use encryption will protect data only against amateur attacks. If you have valuable corporate data on a Mac that gets stolen, and the hard drive is merely "locked" with one of these packages, you have no protection whatsoever against a determined thief. Unlocking a locked disk is no challenge to someone who really wants the data on it. Encryption, on the other hand, gives you real security against stolen hardware.

If you need to control Mac security over a network, check out Empower Remote or FolderBolt Pro, which offer remote management. usrEZ expects to ship ultraSecure with ultraCommand ($374), which it says will include remote management, by mid-December.

Three Vendors' Approaches to Security Software

Company	Phone	Product	Price	File/Folder Encryption	Self-Decrypting Files	"Fast Encryption"	DES/ Stronger DES	Folder Locking/ Access Levels	Locking Screen Saver	Lock at Boot	Remote Management
Kent Marsh	713/522-5625;	CryptoMactic	$99	●	●	●	●/●	○	○	○	○
Software	800/325-3587	FolderBolt Pro	$129	●	●	●	●/●	●	●	●	●
		NightWatch II	$159	○	○	○	○/○	○	●	●	○
Magna	408/879-7900;	Empower	$396	●	○	●	●/○	●	●	●	●
	800/806-2462	Remote									
usrEZ	714/756-5140;	cypherPad	$49	○	○	○	○/○	○	●	●	○
Software	800/482-4622	ultraSecure	$239	●	○	●	●/●	●	●	●	○

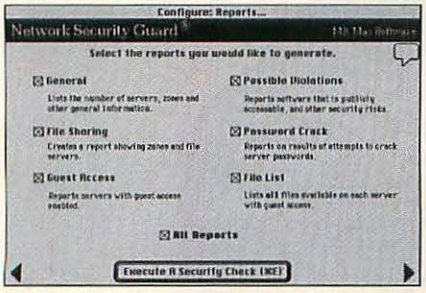
● = yes; ○ = no.

it has all the design grace of a 1950s transistor radio.

Digital Pathways offers automatic authentication for ARA users, which eliminates the need for a hardware token entirely. Inserting the Digital Pathways Defender 5000 chassis ($5750 for four ports) between ARA servers and programming it for a test user isn't for the faint of heart—it took me several hours. Once I finished, I found using the server with ARA to be incredibly simple—something every Mac user will appreciate.

If you like the Defender but want a more elegant token for your dial-in users who aren't using ARA, CryptoCard provides a completely compatible package called a CryptoCard (prices start at $100 per user).

Time-Synchronized Passwords Security Dynamics takes a different approach to authentication. It sells SecurID cards (starting at $58) that are time-synchronized to its ACE/Server security-server software (starting at $1995), which sits on a Unix server or workstation attached to the network. The Unix box should be dedicated if you're at all serious about security. Every 60 seconds (or 30, optionally), the little LCD display on the SecurID card changes to a different 6-digit number. When logging on, a user whips out a SecurID card and types in the number displayed (plus a PIN, of course). No buttons to push, no challenge at all.

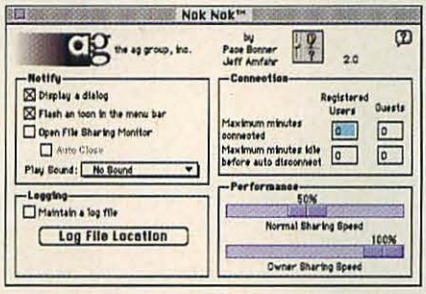


Finding the Weak Spots Network Security Guard from MR Mac Software helps identify possible security problems by auditing Macintosh file servers and reporting what software is running, which servers offer guest access, and which ones have easy-to-guess passwords.

The downside of this style of authentication is that the cards have to be time synchronized. They have a limited battery life (usually two or three years), and then you have to discard them, buy new ones, or reenter the card information into the security database. This costs big bucks, both in capital and personnel time.

While Security Dynamics offers hardware interceptors, it is also working aggressively with other hardware vendors to link hardware products to ACE/Server. Remote-access servers from companies such as Shiva Corporation, 3Com, Cayman Systems, and Apple can support SecurID client software.

To test its ARA capabilities, I added the Security Dynamics ACE/Server to an existing network of Shiva LanRover/E ARA servers. The ARA users got a floppy of additional software and a SecurID card. Dialing in was lengthened by one step, as remote users now had to enter the number currently displayed on their SecurID card. Once I got over the pain of installing a key server on Unix, the Security Dynamics products combined with Shiva's LanRover made a great team—and I didn't have to mess with hardware.



Who's There? Nok Nok from The AG Group alerts you when someone connects to your Macintosh via System 7's personal file-sharing feature. This user has configured the software to display a dialog box and flash an icon in the menu bar when another user connects.

> Concentrate on dial-in users, where networks are the most vulnerable

Four Top Security Books

For further reading, start with *Protect Your Macintosh*, by Bruce Schneier ($23.95; Peachpit Press, 510/548-4393). The best general guide to Macintosh security, this book contains an excellent and up-to-date chapter on network security.

Schneier is also the author of the best book on security protocols and algorithms, *Applied Cryptography: Protocols, Algorithms, and Source Code in C* ($44.95; John Wiley & Sons, 908/469-4400).

Another excellent discussion of network security, mostly from a theoretical point of view, is in *Computer Communications Security*, by Warwick Ford ($58; Prentice Hall, 515/284-6751).

If charged with the task of writing a network-security policy for your company, consider investing in *Information Security Policies Made Easy*, by Charles Cresson Wood (Baseline Software, 415/332-7763). At $495, it's not a casual buy, but its 600 sample policies will give you a big head-start, especially since the company also sends the manual on disk (which is handy if you want to cut and paste the policies).

The Last Word

Vendors want to sell you lots of expensive dedicated security hardware, but I advise holding off unless you need to deploy a large number of ARA users right now. If you want something that intercepts callers *before* they hit a modem bank, TraqNet is a great idea. However, all the other interceptors are doing in hardware what server vendors should do in software. Over time, the need for hardware authentication interceptors will go away as server vendors work with security-software vendors to integrate security directly into servers (as companies like Shiva, 3Com, Cayman, and Apple have done).

Before running out and buying piles of hardware, make sure you take basic steps with the software you already own. Use the built-in security features of AOCE to reduce the number of passwords you have to type each day. Tools like Network Security Guard will help you identify network problems that you can solve without spending a dime.

Concentrate on dial-in users, where networks are the most vulnerable. If your server vendor doesn't already support a token-based access system such as Security Dynamics' or Digital Pathways', turn on the heat to make them see the error of their ways. Avoid the headaches of a Unix-based key server if you can—even if it means waiting for the market to catch up.

Most important, teach people about the need for security and what your organization considers to be valuable enough to protect. By creating an awareness of the potential problems, you'll have the entire organization working with you to keep the network secure. **m**

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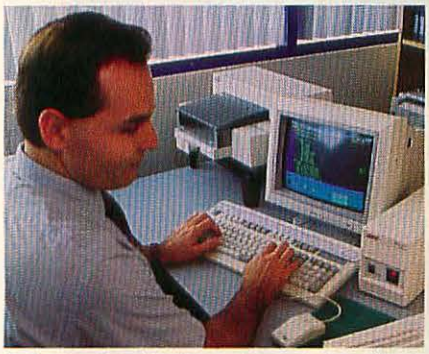

"All other brands of UPS die regularly in this lightning prone environment. My APC won't die!" said Paul Sisilli, Systems Analyst, City of Port St. Lucie . "With other brands, users don't find out until it is too late. The power interruptions here are very hard to live with. The other brands are dying off. Typically they last just beyond their warranty period. My Back-UPS is going on three years...no other brand is as reliable."

Don Truax knows first hand about Back-UPS reliability: "It ought to be against the law to buy a computer without an APC Back-UPS 250. I recently had a direct lightning hit right outside the house...my computer never blinked. Each morning I get a surge down the line and both APC's hate it - they simultaneously 'holler 'n clamp' while my 'Brand T' quietly sleeps in. I've relegated that unit to non-critical household stuff like my VCR."

Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. "One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I then bought my Back-UPS for less than half of what I had paid for the others. We've purchased three more Back-UPS and for the past 14 months they've been just hummin' away on the same power line that was eating the other brands alive!"

If you're protecting a network server, a communications interface port (on models Back-UPS 400 and higher) provides the security of an automatic shutdown to all major OS including NetWare, Windows, Windows NT, LAN Server, LAN Manager, LANtastic, SCO Unix, OS/2, Banyan Vines, AppleShare/System7 and more, so your data is safe whether the system is attended or not. (PowerChute software and interface kits sold separately.)

And since data processed on networked clients needs protection too, the $139 Back-UPS 280 provides an economical solution for all your LAN workstations. And if you have a new green PC, the price is even better at $119 for the new Back-UPS 200.

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450	Tower 486, 386 systems, servers	$279
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900	Multiple systems, longer runtime applications	$599
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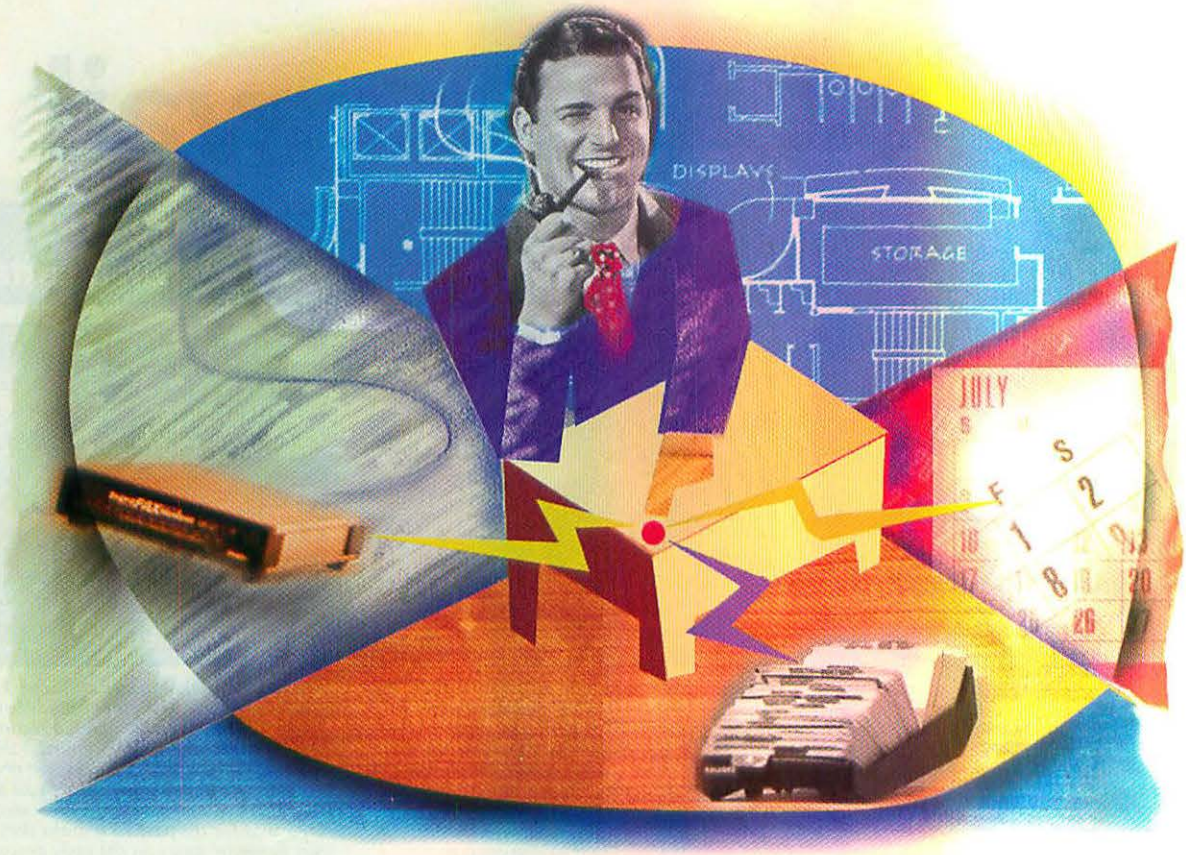


ANDREW FAULKNER

Small-Blueprint

BY JOSEPH SCHORR

For a business that is still a modest affair—but already too big to run from your spare bedroom—you need a blueprint to follow when setting up a functional Mac-based office. You'll have to make do without such big-business luxuries as an information systems (IS) department hovering protectively over your network, or a receptionist informing you when your three o'clock appointment arrives.

Every enterprise, of course, has unique needs, so *Macworld* can't prescribe every piece of software and hardware that yours will require. Still, whether your business is selling bread or manufacturing custom

bicycles, some basic operations are universal. You need to protect and secure the business data you keep on your computer equipment. You need to organize and schedule your daily tasks. You need to keep track of customers and suppliers. And you need to communicate with the outside world by mail, fax, and phone.

For large companies, that all means hiring plenty of staff. But how can you and just a few colleagues handle tasks as diverse as network management, project planning, and public relations without a big-business budget? Our blueprint follows.

Running the Network

In a large corporation, the people who run the business—managers, professionals, clerical workers—don't have to worry about keeping network hardware and software running. If the file server disappears from sight or the network modem acts balky, they simply call the IS department. In a small business, *you* are the IS department, responsible for troubleshooting and managing your network. Without a network guru available, you have to keep things simple, while providing a system powerful enough to handle your business's computing tasks.

First Connection First you must determine your real network requirements. Do you need a file server and print server, or is the Mac Operating System's file sharing adequate? If your business is small enough—say, ten Macs or fewer—you should get along well using your Macs' built-in network capabilities. System 7's file sharing lets everyone on the network access each other's drives to share information, files, and folders without a dedicated server. For networking at LocalTalk speeds, your investment in equipment is minimal—just the cabling that links your Macs and printers. If speed and heavy traffic are issues, you can use file sharing over Ethernet, a transition made easier by the tumbling cost of Ethernet adapters and the fact that so many Mac models now include built-in Ethernet.

For businesses with more than ten Macs, or with networks where Macs and PCs share printers and communications devices, you'll definitely need file and printer services on a dedicated server equipped with network server software. AppleShare 4.0 (about $1600, supports up to 150 users; Apple Computer; 408/996-1010) provides an arsenal of tools for setting up user-access privileges and protecting sensitive data. AppleShare also provides a centralized print-queue system for up to five printers and allows you to reorder print jobs or divert them to printers with less traffic.

Data Security As your own network administrator, one of your most important responsibilities is backing up and archiving your data.

A good backup system guards against the devastation of losing all your business data due to a system crash, a theft, or other events. You can back up your data on SyQuest disks, optical disks, digital audiotape (DAT) cartridges, or additional hard drives—any medium that can be removed and stored off-site. A solid backup system is going to cost some extra money, but if you weigh the cost against the value of your business data, you'll find the investment well worth it.

Choosing the right medium depends largely on how much data you need to back up. For example, a 270MB SyQuest-based drive runs $550 to $600, and cartridges cost about $65 to $75; that's a reasonable investment if your backup needs are fairly modest. (SyQuest drives are available from most drive vendors.) If, on the other hand, you have gigabytes to protect, go for a tape drive. DAT drives can cost $1000 or more, but a DAT cartridge holds 2GB to 10GB and costs only $10 to $25.

Backing up a single machine doesn't require special software; you can simply drag important files (or your entire hard drive) to the backup device. But backup software can automate the process. For example, DiskFit Pro 1.1 ($125; Dantz Development Corporation; 510/253-3000) can perform basic, single-machine backups automatically; you could schedule DiskFit to copy your Current Accounts folder to a designated SyQuest drive every weekday at 6:30 p.m. and shut

LAY THE FOUNDATION FOR A MAC SYSTEM THAT CAN GROW WITH YOUR BUSINESS

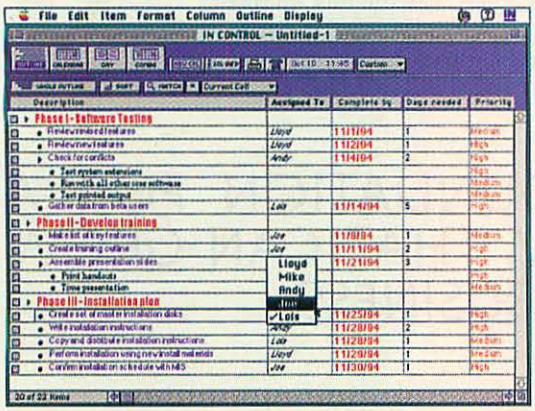
Office

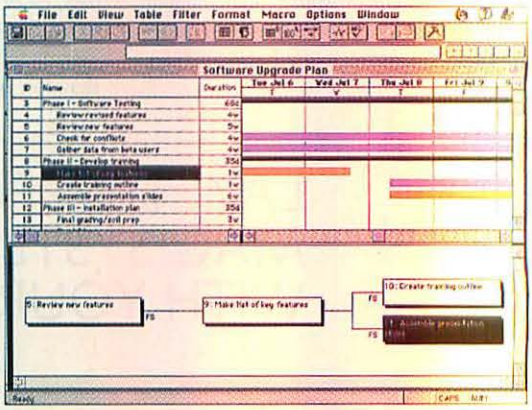
down your Mac when it's done. DiskFit can also remind you to back up when you shut down manually.

Backing up several Macs or file servers over a network is a bit more complex. You could run a separate backup on each Mac, but equipping every workstation with backup software is expensive and cumbersome. It makes more sense to do a centralized backup that grabs files from anywhere on the network and copies them all into one archive. That's exactly the purpose of a network backup program such as Dantz's Retrospect Remote 2.1 ($449).

Retrospect Remote handles up to 10 Macs (additional 10-packs are $247; 50-packs are $1095). Retrospect's strongest feature is its extensive scripting capability: you can select files and folders for backup by name, date, size, type, label, or owner. The software scans each Mac on the network, finds and backs up files based on your criteria, and shuts down each Mac as it finishes. Retrospect can run a script automatically at any interval.

In the end, backup systems are like health insurance—you shell out cash now for benefits you hope never to use, but you know you're protected against a catastrophe. The bottom line is that your small office needs a backup strategy, because hard drives do fail; it's only a matter of time until one of yours comes screeching to a halt. Depending on your backup habits, that fateful day will be a major disaster or a minor inconvenience.





Two Projections
In Control (left) provides the best of two worlds: an outline of tasks and subtasks, and detailed information about each arranged in a row of cells containing whatever information you deem necessary to track—dates, names, and so on. Microsoft Project (right) is fundamentally different from an outliner: it links each task by duration and dependence to other tasks. Shown here are a Gantt chart (top half of screen) that graphically displays the scheduling of tasks outlined on the left, and a network diagram (bottom half of screen) showing how the same tasks are dependent on each other.

Managing the Office

With an efficient, well-protected network in place, you can move on to the nitty-gritty of managing your office. Appointments, meetings, project schedules, deadlines—keeping track of such details is another essential part of almost any business.

Work Plans In a large-office setting, administrative assistants and secretaries keep the professional staff organized, set up appointments, and watch for schedule conflicts. But in a small office, you're on your own.

The obvious solution is a calendar-and-organizer program, such as In Control 3.0 ($129.95; Attain Corporation; 617/776-1110); Now Up-to-Date 2.1.1 ($89.95; Now Software; 503/274-2800); DateBook & TouchBase Pro Bundle 4.0 ($89.99; Adobe Systems, Adobe Consumer Division; 619/558-6000); and Claris Organizer ($99; Claris Corporation; 408/727-8227, 800/325-2747). All of these packages allow you to record and display your appointments in monthly, weekly, and daily views along with to-do lists for managing your daily tasks (see "Planning Ahead"). They all provide alarms to remind you of upcoming events. But the value of a calendar program depends almost entirely on how fastidiously you enter information: the software can't remind you about business appointments it doesn't know of. So choose a calendar program that makes entering new data as effortless as possible. Now Up-to-Date and DateBook Pro are the top choices in this regard. Now Up-to-Date is the most flexible; it lets you add, edit, and delete calendar items by using a menu that appears in all other applications, even when the calendar program is not running. DateBook lets you add new items anytime, but you have to launch the program to edit or delete calendar items. You must launch In Control and Claris Organizer even to add new items.

Any of these programs are suitable for managing a daily schedule, but if you require project planning and tracking, you probably need more than a simple calendar or a to-do list can deliver.

Project Planning Managing even a simple project generally involves careful planning: outlining it task by task, determining the order in which to complete tasks, and assigning people to perform the tasks. This is a perfect job for In Control. What distinguishes In Control is that, beyond merely providing a calendar view of your work, it organizes tasks in a combination outline and grid format (see "Two Projections"). Each phase of a project can be a main heading with its tasks listed as subheadings, and each task listing in turn can contain information in columns, such as who is responsible for the task and when it should be completed. The program lets you search and sort on any column so that, for example, it's easy to break out a list of this week's tasks or of tasks assigned to a specific individual.

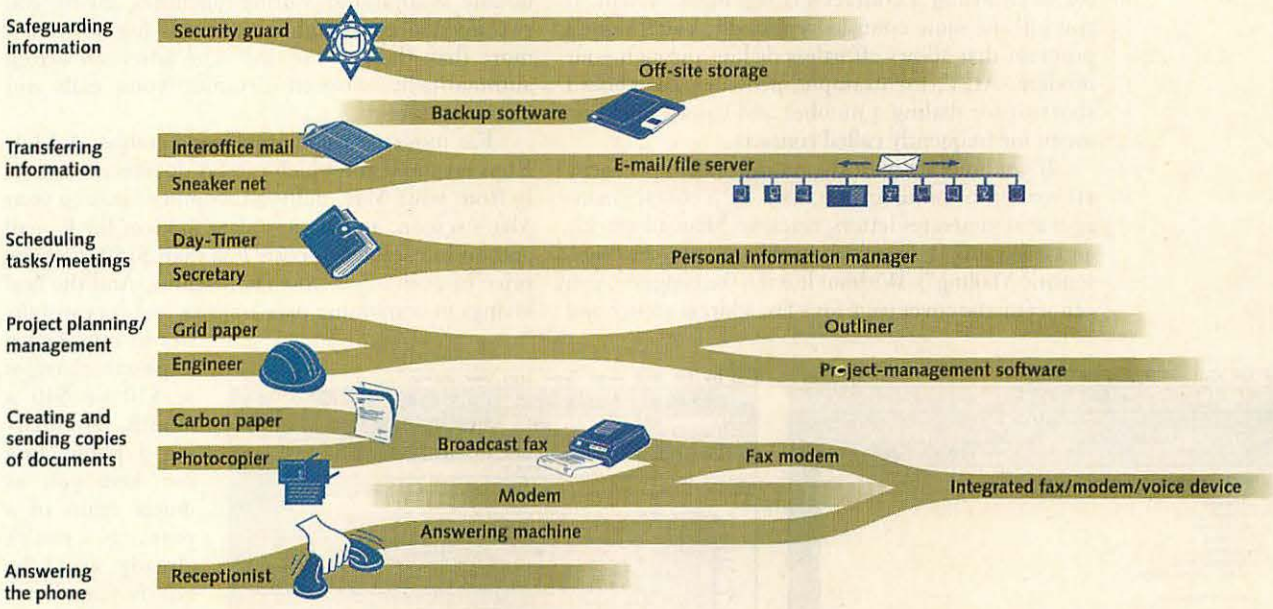
In Control's outline-based approach is all you need to handle straightforward linear projects. But suppose your projects are more complex, involving numerous tasks performed concurrently by overlapping workgroups? For that, you'll need to leave your outliner behind and move up to a dedicated project-management package.

Project Management Project-management software takes a much more structured approach to planning and scheduling. It is complex, and using it effectively requires learning something about conventional project management. But it can be a useful tool for larger projects.

Microsoft Project 3.0 ($470 company's estimated price; Microsoft Corporation; 206/882-8080), for example, allows you to map out complex relationships between interdependent tasks—such as, don't start Task 5 until Task 4 is done, but don't complete

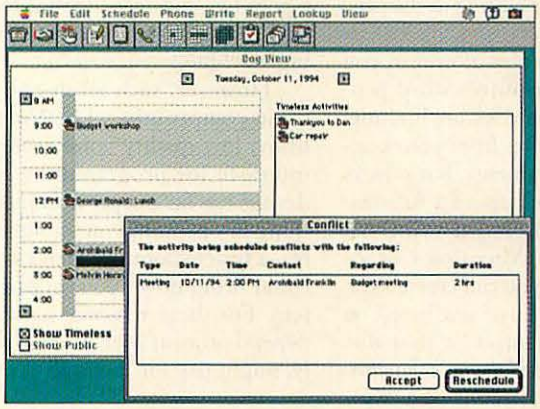
Perfection of the Small Office

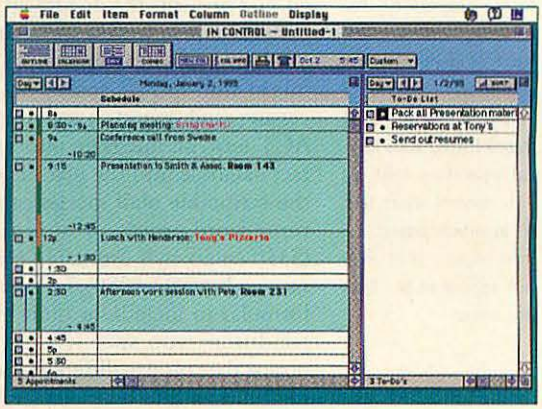
As methods for performing critical office tasks evolve they are also converging, becoming more efficient and flexible. For the office dweller who embraces technology and assumes the expense of replacing obsolete products, office-automation tools relieve drudgery and can become a competitive advantage.



Task 5 until Task 6 has been started (see "Two Projections"). After you enter tasks with their durations and resource requirements and then establish the relationships between them, Project can spit out a projected completion date or work backward to calculate when work must begin in order to finish by your goal date. If you enter financial data, the program can generate a budget and estimate cash flows.

Obviously, a program like Project is overkill if you don't require this level of hairsplitting precision. A solid to-do list and calendar manager is probably the tool most small offices will find the most helpful for keeping tasks on schedule.





The Front Desk

Maintaining good relations with the public is a basic component of any business: you must know your customers, anticipate their needs, and let them know that you value their patronage. This job requires some kind of contact-management software.

Contact Management Tools for managing contacts range from basic electronic address books to elaborate contact databases such as ACT 2.0 ($249.95; Symantec Corporation; 503/334-6054), which allows you to store enormous amounts of data about each contact; make phone calls efficiently; set up appointments; and quickly generate faxes, E-mail, and letters.

When choosing a contact manager, first determine how much detail you need to track. Do you simply want quick access to names, addresses, and phone numbers? Almost any card-file-style software will do. But to maintain a history of client calls, a log of buying patterns, or reminders for keeping on top of sales negotiations, a full-scale contact-management program is nearly indispensable.

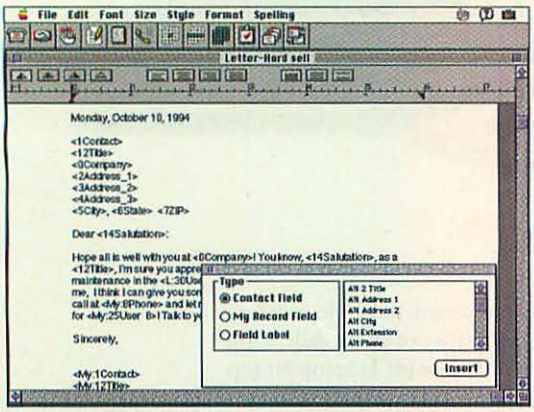
Contact-management programs provide customizable fields for recording useful but nonstandard information—your contacts' favorite restaurants, for example. You can also keep lengthier notes on each contact—ACT in particular offers powerful features for creating on-screen or paper reports about a contact's call history, past and future activities, and other information.

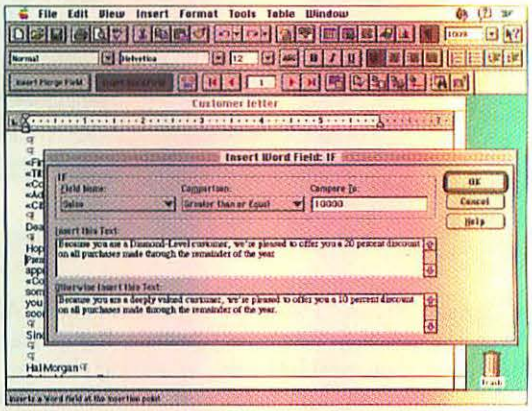
Make sure your contact manager integrates closely with your calendar or organizer software. When you make a lunch date, you'll want to record it without jumping from address book to calendar and reentering data. Integrated contact/calendar programs, such as DateBook and TouchBase Pro, Now Up-to-Date and Now Contact, and the all-in-one Claris Organizer, make it easy to establish these links. ACT also includes built-in scheduling, so you can easily link contact information with appointments and reminders.

Planning Ahead Most programs with a calendar module provide a standard set of features for managing your work. For example, ACT (left) and In Control (right) can show you some combination of day, week, and month views along with a list of unscheduled to-do items. ACT, as shown here, warns you when you schedule two events at the same time.

Document Communication How you prefer to communicate with your customers is also a key factor in choosing a contact-management system. If you call the same contacts repeatedly, you'll want a program that allows effortless dialing through your modem. ACT, for example, provides a keyboard shortcut for dialing a number and has a QuickList menu for frequently called contacts.

If you interact with the outside world primarily via written communication, look for a contact manager that generates letters, faxes, and E-mail quickly and easily. ACT is superb in this regard (see "Systematic Mailing"). Without leaving the program, you can set up the cover page for a fax, address a letter and its envelope, or compose an E-mail message. ACT automatically grabs the contact information, formats it with a built-in template or with one you've created, and presents the document for editing in the program's built-in word processor.





Systematic Mailing ACT (left) provides a simple, automated mail merge capability for knocking out a quick batch of identical letters addressed to a subset of your contacts. Microsoft Word (right) adds logical operators that let you control what text is inserted based on information that may not appear in the final document.

If you rely heavily on mail merges, however, you might find ACT's somewhat primitive word processing module and custom template feature limiting. ACT lets you integrate information from your contact database into the text of documents, but it lacks the scriptable mail merge capabilities of a full-featured word processor such as Microsoft Word 6.0 ($350 company's estimated price; Microsoft Corporation; 206/882-8080). In Word you can create logic formulas to include or omit blocks of text based on conditions you specify—for example, a past-due notice that inserts different boilerplate text depending on how late the recipient's check is (see "Systematic Mailing").

Telephone Communication Of course, managing contacts usually requires more than cranking out a mail merge: voice, data, and fax transmissions constitute a major part of business communications. In a big office, the receptionist answers and transfers calls, sends faxes, and passes incoming faxes to interoffice mail for employees scattered throughout the building. In a small office, electronic devices can substitute for people power.

You have two choices: You can either buy a fax machine, modem, and voice-mail system—and install phone lines for each—or opt for a combination device that provides all these functions over a single phone line. (For a more detailed discussion of faxing, see "Fax or Fiction?" in the December 1994 issue of *Macworld*.)

In some cases, the combo approach makes good economic sense. For example, many fax machines double as digital answering machines, giving you two needed communications tools for not much more than the price of one. The units can switch automatically between incoming voice calls and incoming faxes.

Fax modems are another good combo. A 14.4-Kbps fax modem—which can fax documents directly from your Mac, deliver incoming faxes to your Mac's screen, and act as a data modem for E-mail and online services—costs less than $150, half the price of even a low-cost fax machine. And the real savings in combining data-transfer and fax capabilities in one device is phone charges: at $30 or $40 a month, eliminating a phone line can save you as much again in a year as you've already saved by not buying a fax machine.

For a few hundred dollars more, you can add full voice capabilities to the mix. For example, the Vomax 2000 ($479; Macronix; 408/453-8088) can receive faxes, store them, or forward them to you on the road; route data transmissions to and from your computer; and record voice messages. (The futuristic-looking Vomax can also serve as a regular answering machine.)

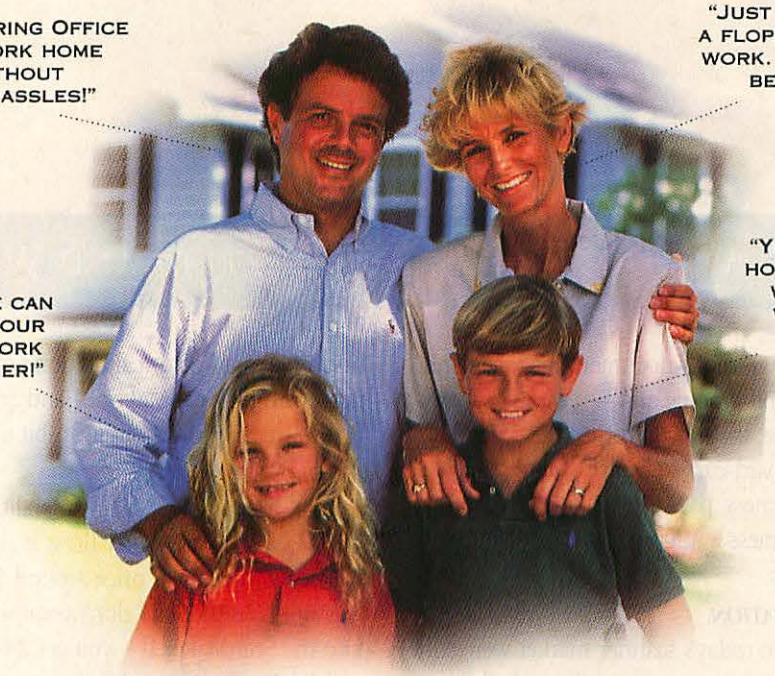
However, such all-in-one convenience requires some compromise. The Vomax, for instance, has tinny, low-quality voice recording and a miserable interface for programming it. And none of these devices can fax a paper document. Worse, with everything in one unit, your computer must run flawlessly—a system bomb or even a slow-witted screen saver could bring down your entire communications system. For these reasons, separate devices that don't depend on your Mac, though more expensive initially, might pay for themselves in reliability.

The Last Word

Being your own network administrator, office manager, project manager, public relations director, and receptionist is a tall order. But with a Mac on your desk and with carefully chosen hardware and software tools like the ones we've described, you can provide the support your business needs without hiring a big staff or spending big bucks. Then, when everything in your small office is under control, you can become your own human resources director—and give yourself a raise. ■

JOSEPH SCHORR is the network administrator, office manager, project manager, public relations director, receptionist, and janitor of a small office located over his garage. He is coauthor of *Macworld Mac and Power Mac Secrets* (1994, IDG Books Worldwide).

SoftWindows Makes Home Work Easier.



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Circle 68 on reader service card

Let's talk scanners.

AT MICROTEK, WE DON'T MAKE COMPUTERS AND WE DON'T MAKE

Whatever you buy a scanner for — document management, desktop publishing, high-end graphic arts — you want the best scanned image possible, the most advanced features and the highest value for your hard-earned dollar.

That's why people who know, pass up the "johnny-come-latelies" in the scanner business and go straight for the first name in scanners: Microtek.

A Reputation for Innovation.

While many of the names in today's scanner market were still making computers, laser printers...or even radios, of all things, Microtek was racking up an impressive array of firsts in scanners.

Microtek brought the first halftone desktop scanner to market in 1984. Microtek was also responsible for the first 256-tone grayscale scanner, the first affordable desktop color scanner and the first affordable 35mm slide scanner. With the recent introduction of Dynamic Color Rendition (DCR), Microtek produced the first automated color calibration and correction system. And now, with the ScanMaker III and ScanMaker 45t, we're the first to market with honest 36-bit desktop color scanners.

Microtek's Family of Scanners includes: ScanMaker III, ScanMaker IIHR, (both shown with optional transparency adapter), ScanMaker 45t, ScanMaker IISP and ScanMaker II.

Affordable Quality.

Don't need color scanning capabilities? Then don't buy them. The Microtek ScanMaker IIG is a great 300 x 600 gray-scale scanner with a street price around $400.

Want color but still don't want to spend big bucks? Look into the ScanMaker II – you get 24-bit color flatbed scanning *and* Adobe Photoshop LE for around $550.

Looking for a fast, single-pass scanner for office and graphic applications? The ScanMaker IISP is the winner of two important Editors' Choice Awards from *PC Magazine* and from *Imaging* magazine. It has software enhanced resolution of up to 1200 x 1200 and a street price of around $750.

For more sophisticated applications, there's the ScanMaker IIHR. You'll get software enhanced resolution up to 2400 dpi — which makes it very popular with

PRINTERS. ALL WE MAKE ARE THE BEST SCANNERS YOU CAN BUY.

PC MAGAZINE EDITORS' CHOICE February 8, 1994 Microtek ScanMaker IISP

IMAGING MAGAZINE EDITORS' CHOICE

graphic artists — and a price of around $1100, which makes it very popular, period.

68 BILLION COLORS.

With 36-bit color resolution, the ScanMaker III and ScanMaker 45t are working with far more data than any 24- or even 30-bit scanners. A palette of 68-billion colors means unparalleled richness and depth, clarity of detail and color accuracy that rivals machines costing much more.

The ScanMaker III is a fast, single-pass flatbed scanner with DCR color calibration, software enhanced resolution up to 2400 dpi and a street price under $2700.

You read it right, under $2700.

For real high-quality work, the ScanMaker 45t offers photographers and graphic artists up to 2000 x 2000 dpi software enhanced resolution for scanning transparent images up to 5" x 5". It costs about $6500 and offers a level of quality that – until now – was only available to professionals using costly drum scanners.

FIRST NAME IN VALUE.

No matter how much money you have to spend, you'll find your best value is with Microtek. For example, most Microtek scanners come with Adobe Photoshop or Adobe Photoshop LE at no extra cost.

Microtek is the world's largest desktop scanner manufacturer. We've made more scanners, longer, and have a history of more scanner awards and innovations than anyone else you can name. And since we don't divide our attention between computers, printers and miscellaneous consumer products, we can concentrate on making the finest products in the scanning business. For your free copy of our scanning primer *The Scanned Image*, more information about scanners and Microtek in particular, just call us at 800 654-4160 or fax a request to 310 297-5050.

MICROTEK

Better Images Through Innovation.

Before you buy a scanner, let's talk.
800 654-4160

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Circle 287 on reader service card

EDITED BY CATHY ABES

Graphics

THE LATEST IN DESIGN, PUBLISHING, AND PREPRESS

Focus on Digital Cameras

NIKON, LEAF SYSTEMS, AND OLYMPUS Image Systems have announced new color digital cameras that range in price from $12,000 to $55,000 and collectively offer such features as direct telephone connectivity and ultrahigh-resolution image capture.

Nikon's E2 and E2s digital, single-lens reflex (SLR) cameras are designed for field and studio photography. Both models support interchangeable lenses and, unlike most digital cameras, the ability to use a lens's full field of vision; autofocus and autoexposure; built-in NTSC and PAL video output; RS-422 serial connectivity; and a 1.3-million-pixel Fuji CCD, which lets you capture images at 1280 by 1000 pixels. The E2 can shoot images at a speed of 1 frame per second (fps), the E2s at 3fps. The E2 cameras store JPEG-compressed images on a PCMCIA card, and the cameras' film-speed equivalent is ISO 800/1600. Both cameras will be available in the spring of 1995; the E2 will retail for about $12,000 and the E2s for about $16,000. (Final pricing wasn't available at press time.)

Leaf Systems' CatchLight single-exposure digital camera back features a CCD capable of capturing 42-bit images (14 bits per color channel) in ultrahigh resolution—2048 by 2048 pixels. The CatchLight works with the Hasselblad 553 ELX and 500 EL series, the Mamiya RZ67, and other high-end cameras and is particularly suited for catalog and portrait photography, according to Leaf. The camera back ships with a native Power Mac utility for capturing and handling photos; you'll need a Power Mac 8100 with 72MB of RAM and a free NuBus slot for the unit's interface card. The $55,000 CatchLight is expected to be available in early 1995.

Meanwhile, Olympus says its VC-1100 is the world's first digital camera with built-in transmission capabilities. Photojournalists and other photographers can connect a modem to the VC-1100 and upload digital photos over cellular and analog phone lines. The camera, which has a built-in zoom lens and an image-capture resolution of 768 by 480 pixels, stores images on PCMCIA cards. Its color LCD viewfinder lets you preview photos on location. At press time, pricing and availability had not been set, but the VC-1100 and a lower-end model, the VC-100 (without transmission capabilities), should ship in the United States by early 1995 for around $4000 and $3700, respectively.

Nikon, 516/547-4355; Leaf Systems, 508/460-8300; Olympus, 516/364-3000.
—JAMES A. MARTIN

KEVIN CANDLAND

Drum Scanners for the Desktop

OPTRONICS AND SCANVIEW A/S have announced new drum scanners for the digital prepress market that continue the trend of competitively priced, high-resolution models for the desktop.

• Optronics has updated its line of ColorGetter drum scanners with the ColorGetter 3 Prima, 3 Plus, and 3 Pro, all available now. The latest ColorGetters offer a 4.0 dynamic range and up to 8128-dpi resolution, with the ability to enlarge images up to 3000 percent. The single-pass scanners capture 36-bit color and include three photo-multiplier tubes

(PMTs). All three models can scan reflective artwork, transparencies, and film negatives in gray-scale or color. The ColorGetters use xenon lamps, which promise greater color fidelity and tone separation than halogen lamps, the company says.

All three models support batch scanning, automatic calibration, and variable focusing. Drums are removable, so the next job can be prepared while the scanner is in operation. The ColorGetter 3 Prima ($35,750) can scan originals up to 8 by 10 inches; the 3 Plus ($41,450), up to 10.5 by 12 inches; and the 3 Pro ($47,450), up to 11 by 15 inches.

SCOTT PETERSON

The ScanMate 4000 single-pass drum scanner, from ScanView A/S, can scan prints, negatives, and transparencies at 4000 dpi.

Optronics provides a choice of two Power Mac–native scanning-interface programs, ColorRight 3.1 ($3500) and ColorRight 4.1 ($4500), sold separately. Both versions can convert from RGB to CMYK and perform unsharp masking during the scanning process, but ColorRight 4.1 offers higher-end tools not available in 3.1, such as selective color correction.

• ScanView's $35,000 ScanMate 4000, available now, offers a dynamic range of 3.8, a maximum resolution of 4000 dpi, and the ability to scan color and gray-scale originals—reflective (both positive and negative formats) and transparent—up to 8¾ by 12 inches. The single-pass ScanMate can enlarge images up to 1000 percent, has three PMTs for 36-bit color capture, and uses a halogen light source. It has a removable drum and ships with an Adobe Photoshop plug-in.

In addition, ScanView sells two scanning and color-separation programs: ColorQuartet RGB V3 ($1100), targeted for outputting to film recorders and other RGB devices; and ColorQuartet CMYK V3 ($1650), which automatically produces CMYK separations during the scanning process. Both programs are Power Mac–native.

Optronics, 508/256-4511; ScanView A/S, 415/378-6360.—JAMES A. MARTIN

QuickDraw and Photoshop at Full Tilt

EA RESEARCH'S EASYCOLOR 24/1360 24-bit color graphics board combines fast CMYK-to-RGB conversion with QuickDraw and Adobe Photoshop filter acceleration. Currently shipping, the $1999 board supports large-screen displays as high as 25 inches (monitor resolutions up to 1360 by 1040 pixels).

The EAsycolor 24/1360 is the only 7-inch NuBus card available for Macs and Power Macs that lets you convert screen images from CMYK to RGB mode, according to the company. The fast screen redraw enables graphic designers, desktop publishers, and prepress professionals to work with images in CMYK mode and thus achieve more-accurate color, instead of working in RGB and converting to CMYK at output time.

A boon for Photoshop users, the EAsycolor speeds up seven Photoshop filters—Blur, Blur More, Sharpen, Sharpen Edges, Sharpen More, Gaussian Blur, and Unsharp Mask. The board achieves its speed by combining a 30-MIPS RISC processor with a graphics coprocessor and 8MB of video RAM. EA Research, 510/867-0967.—JAMES A. MARTIN

IN BRIEF

■ **Xanté's LaserPress** Xanté's $7495 LaserPress 1200 prints full-bleed 11-by-17-inch 1200-dpi output and imagesetter-quality halftones. The PostScript Level 2 laser printer includes a 33MHz RISC processor; 20MB of RAM (upgradable to 64MB); simultaneously active serial, parallel, and AppleTalk ports; and Ethernet support. 205/476-8189.

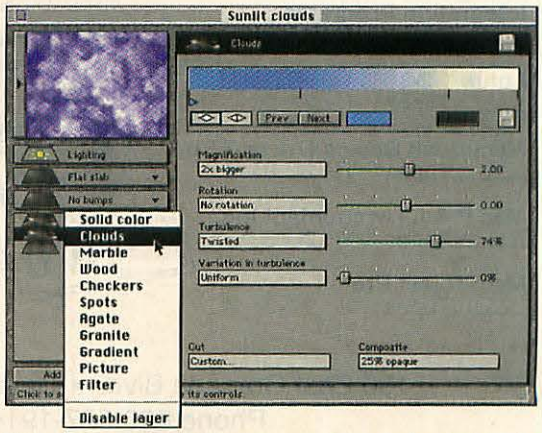
■ **PhotoDisc's Latest** Each $299 disc in PhotoDisc's four-volume Signature Series of stock photo CDs (now shipping) showcases works by a single photographer or studio and includes up to 100 high-res RGB TIFF images on a theme. 206/441-9355.

■ **Collage Layers in Photoshop** Version 2.0.1 of Specular International's $399 image-compositing program enables you to export Collage files to Photoshop 3.0 with all image layers intact—useful for color-correcting a single layer, for instance. Collage imports Photoshop layers as flat files, however. The update from version 2.0 is free. 413/253-3100.

From Abalone to Zebra Skin

BECAUSE YOU NEVER know when you'll need an image that looks like Belgian limestone, Adobe Systems has begun shipping TextureMaker 1.0, a texture-design program for use with still and animated images. The $199 application for 680X0 Macs and Power Macs ships with more than 100 predefined textures that range from the everyday (marble, wood, rippling water) to the unexpected (eucalyptus bark, Michelangelo's *David*).

You can customize a texture by combining up to ten individually editable layers that include any of four layer types: color (a solid color, gradient, or pattern); material (a slice cut from a solid block); an imported picture; and a Photoshop-compatible plug-in filter. You can apply effects such as lighting and color controls, embossing, and engraving; and for animated textures, evolve, moving waves, and swaying lights. You can render final images in TIFF or PICT format or save sequences as QuickTime movies. Adobe, 415/961-4400.—JAMES A. MARTIN



With Adobe's TextureMaker, you can design custom textures by modifying a preset texture template or an imported image.

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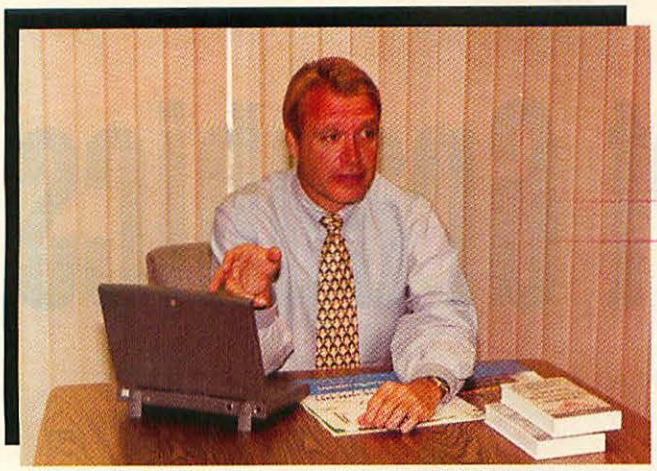


Randall Smith, president of Florida Marketing International...founder of MacAcademy

Why I recommend MacAcademy Training Videos to anyone using a Macintosh computer...

After training more than 267,000 Mac users—I know what works and what doesn't!

Macintosh training comes in all sizes, formats, and prices. The sad fact is that most of it is ineffective. Believe me, I know. For the past eight years I have studied and used nearly every Mac training technique that exists. And when everything is said and done VIDEO training is still the most effective and the least expensive method available!

The Training Challenge

Regardless of the method, the first step in Macintosh training is getting people to use it. There are hundreds of companies who have all kinds of exotic training programs sitting on shelves and tucked away in closets. People watch videos! They're easy, familiar, and non-threatening. People use them!

The Learning Curve

The Macintosh is a *visual* machine. It thinks in pictures. By far, the most effective way to teach the Macintosh is through *visual* means. Pictures are worth a thousand words. Video training offers a complete teaching experience which actually recreates the classroom setting. Our studies show a Mac user will master software techniques three times faster through video training than reading manuals, faster than audio training, and even faster than more expensive disc based interactive training.

MacAcademy Video Training

The last Macworld World Class Award in training was awarded to MacAcademy. In fact, readers chose the MacAcademy training program two to one over all the others. Why? Because it works. It's easy, it's complete, and it's inexpensive. Companies can make great advertising claims but the proof is in end results.

The Need For Training

I'm still amazed at the number of people who buy faster computers to increase their speed. A new, faster computer may save milliseconds whereas training can save hours, days, and even weeks of valuable time. Tom Peters has said training is the best investment you can make in an employee. I have to agree.

Selection Of Training Subjects

Take a minute and study the adjacent page. MacAcademy offers more training on more subjects than any other training organization. Please note the number of videos devoted to the Macintosh itself in addition to the wide variety of programs. Each video offers approximately two hours of training and comes with an easy to use counter system allowing the user to go immediately to specific techniques.

MacAcademy Instructors

I sat up one night watching late night TV and caught one of those computer video shows. Just for the heck of it I ordered the video. Poor quality, poor teaching, and absolutely no value for your money. I guess anyone can make a video but everyone cannot teach effectively! MacAcademy uses only highly rated instructors from our live MacAcademy training workshops. Each instructor is an expert in their field with years of teaching experience and teaching methods that have been proven in front of thousands of students.

Price

Seven years ago we introduced the MacAcademy Video Training Library. The price per video was $49. Today the price is still $49. Sometimes it's hard to tell what our competitors prices really are. They go up and down, change daily, and vary depending on the source. The key word at MacAcademy is *consistency*—our quality remains high, our price remains low. Again, this is why more than 28,000 companies worldwide have chosen our video system as their primary Mac training solution.

Guarantee

If you aren't happy with our product you won't come back. Many of our customers have been with us for years and are extremely pleased with the product, but to make all of our customers comfortable, we place a complete 30-day money back guarantee on all of our products. Plus, if you buy any MacAcademy video, and a new software version is released after your purchase, you may upgrade your training materials for only $14.95 per video. I urge you to study the video selection on the adjacent page and act now to improve your knowledge, productivity, and value as a Macintosh user.

Circle 106 on reader service card

Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

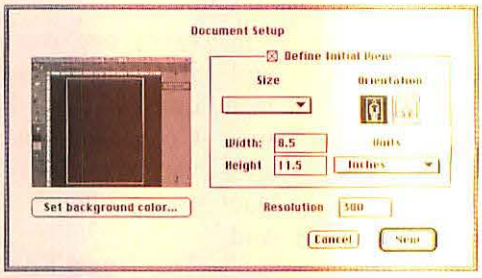
Artist: John Lund is a photographer based in San Francisco who specializes in digitally enhanced photography. He has lectured on digital imaging at numerous graphics-industry conferences, including Macworld Expo, Seybold San Francisco, and Viscom West. His work has appeared in such publications as *Popular Photography*, *Professional Photographer*, *Computer Artist*, and *Publish*. Lund's advertising clients have included Adobe Systems, Apple Computer, Hewlett-Packard, and IBM.

How It Was Done: For the illustration that opens this month's feature on image processing programs, Lund began by scanning in five of his photographs: two cowboys on horseback, a herd of horses, the Teton mountain range (these three photos were taken near Jackson Hole, Wyoming); a cloudy sky (shot in Santa Fe, New Mexico); and Lake Tahoe.

Lund first defined a view for the final image in Live Picture's Document Setup window. After inserting the photo of the sky as the first layer, he used Live Picture's Color Correction command to change the sky's color from blue to turquoise. Next he inserted the photo of the cowboys as the second layer, sized and positioned it, and used the eraser to delete the areas of the photo above the cowboys. He then added a Sharpen/Blur layer, where he used a brush to selectively apply sharpening to the cowboys.

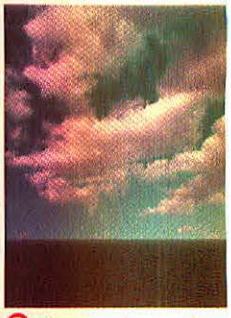
Lund then inserted the photo of the horses as the fourth layer, set the opacity to zero, and painted in the horses. After painting in the mountains (the fifth layer), he used the Color Control command to boost contrast. Next, he added an Image Clone layer to repeat part of the mountain range on the left side of the image.

After painting the image of Lake Tahoe into the foreground below the riders as another layer, Lund added a Color Correction layer to boost the saturation. Once he built out the final image as a TIFF file, he opened it in Photoshop, where he did some cleanup work, cloning out unneeded areas of the image. m



1 Live Picture's Document Setup window, where you can define the initial view of your image by setting its proportions, resolution, orientation, and background color.

2 The original photo of the sky with clouds, which became the first layer of the image.



3 The sky after Lund used Live Picture's Color Correction command to make it a deep turquoise.

4 After he inserted the photo of the cowboys into the image as the second layer.

5 Lund inserted the horses photo by setting its opacity to zero (which made it completely transparent) and painting it into the image with a medium-size brush.

8 After adding a Color Correction layer (Create>Color Correction), Lund increased the saturation by 50 percent and applied it to the entire image.

7 To clone the mountains, Lund first added an Image Clone layer (Create>Image Clone), then option-clicked on the area he wanted to clone from, dragged to the destination area, and started painting them in.

THE TOOLS

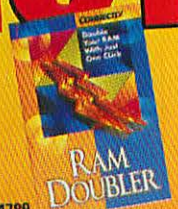
Hardware: Macintosh Quadra 950 with 140MB of RAM, 1.6GB internal hard drive, and DayStar Digital PowerPro 601 accelerator board with FastCache PowerPro daughterboard; Quantum 1.2GB external hard drive; SuperMac Thunder/24 accelerated graphics card; Relax Technologies 44MB SyQuest removable-cartridge drive; SuperMac SuperMatch 21 color monitor; Wacom 12-by-12-inch graphics tablet.

Software: Live Picture 1.5; Adobe Photoshop 3.0.

6 Using the Color Control command (Layer>Ivue Correction>Color Control), he increased the contrast in the mountains by manipulating points on the color curve.

HOT!

16551



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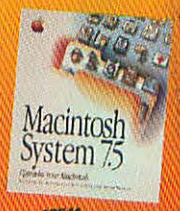

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EDITED BY DAN LITTMAN

At Work

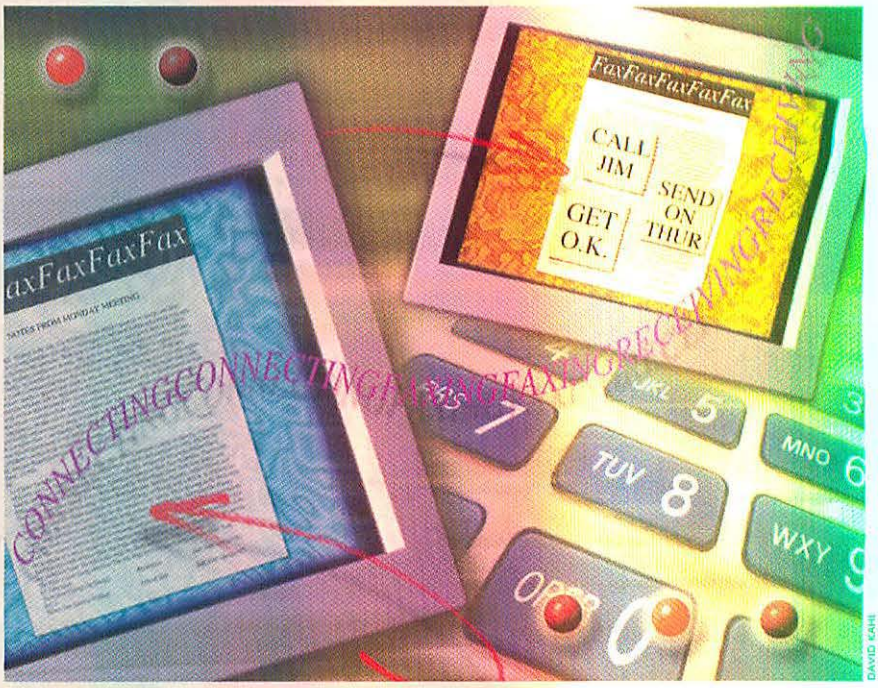
THE LATEST TOOLS FOR BUSINESS COMPUTING

Delrina Ups the Fax Ante

FOR STRAGGLERS WHO STILL aren't convinced that the fax modem is reaching adulthood, Delrina's upcoming revision to its stand-alone fax-modem software, FaxPro, should come as proof positive.

In particular, FaxPro 2.0's address book will abandon the Mac Operating System's list manager in favor of a full-grown database that Delrina claims is equivalent to a dBase/Xbase engine—with support for Microsoft's ODBC database-connectivity tools, an unlimited number of fields, and the ability to share address books over a network with the Windows version of FaxPro.

Version 2.0 will also provide graphics tools for designing cover pages and annotating faxes received electronically, as well as a watermark feature for adding a signature or comment to the background. Delrina says the new version's rendering engine will be able to cope with QuarkXPress files and other hard-to-rasterize formats; the rendering engine will not be available in native Power Mac mode, although the OCR engine will be. Delrina says it will add PowerTalk and QuickDraw GX support someday, but the E-mail links and new imaging engine won't make it into version 2.0. It should ship in early 1995 and will list for $129. Delrina, 416/441-3676.—D.L.



Planning for Success

JIAN TOOLS FOR SALES' BIZPLANBuilder 5.0 adds to the library of software that provides knowledge along with processing power. The Word and Excel templates, which range from a personal financial statement and break-even analysis to an executive summary and a nondisclosure agreement, are structured documents containing boilerplate or formulas and cell labels, as appropriate; all are laced with fill-in-the-blank spaces and blue text indicating Jian's comments.

BizPlanBuilder's documentation focuses on putting the templates to use. It covers the tasks you must perform and the decisions you must make to complete the business plan. It explains, for example, what information a solid plan provides about your company, how to think strategically about the products you plan to sell, and how to project your company's financial situation. BizPlanBuilder costs $129. Jian sells other template-and-knowledge collections, including Publicity Builder ($129) and AgreeMentor ($99). Jian, 415/254-5600.—D.L.

Maximum Fax

FOR ORGANIZATIONS WITH COMplex computing environments and a need for plenty of faxing, Biscom provides fax servers that range from small-workgroup units to the fax equivalent of the corporate mainframe.

The Faxcom 2001 and Faxcom Publisher are single-port servers. The Publisher adds PostScript to the list of image formats—including raw ASCII, standard Epson and HP, bar codes, and others—that the Faxcom 2001 and other Biscom servers support.

The Faxcom 3000 has two or four ports, adds on-board Ethernet, and can route inbound faxes over the network to addressees. The Faxcom 4000 can handle

8 ports; and the 5000, with up to 16 ports, can be rack-mounted and daisy-chained. Biscom is also developing a 24-port system with a T1 interface.

Macs can share a Faxcom server with Windows and Unix machines, AS/400 systems, and VAX and other computers over AppleTalk, VINES, LAN Manager, Pathworks, SNA, and other network protocols; a Mac client for Biscom's NetWare product is in development.

Biscom's software can store forms on a server, fill them with data downloaded over the network, and batch-fax them. Biscom also provides integration with many E-mail packages, a shared address book, and OCR support, as well as a fax-oriented programming language for integrating custom Faxcom systems with other programmable applications such as databases.

Pricing for Faxcom systems ranges from $4995 to well over $30,000, depending on special software, the number of ports, and other options. Biscom, 508/250-1800.—D.L.

Mac Key Disguised as Floppy

IF YOU HIDE YOUR HOUSE KEY INSIDE A plastic rock by the juniper bush or keep a car key in a magnetized case under the wheel well, you'll like the SmartDisk, a little security-algorithm-processing computer that will pop into the floppy drive to allow access to your Mac.

ROBERT PERRY

The SmartDisk looks and acts like a floppy disk, but inside is a small computer that processes encryption algorithms.

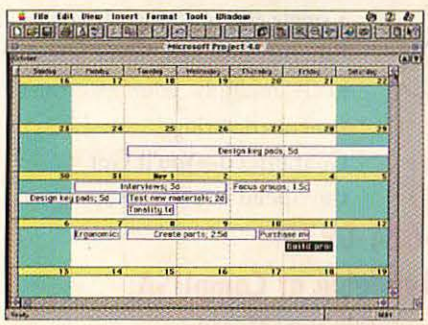
The SmartDisk's companion software, SafeBoot, will encrypt an entire hard disk or folder; when you boot your Mac, SafeBoot will ask you to insert the SmartDisk, compare the password you enter to the one the SmartDisk generates, and eject the SmartDisk to free up the floppy drive. SafeBoot will reencrypt files as you use them, and at day's end you take the SmartDisk home. The SmartDisk-and-SafeBoot combination should ship in late 1994 for between $200 and $300.

SmartDisk Security also markets developers' tools, and the company says several vendors are working on SmartDisk-based products with support for nonstandard encryption and digital-signature algorithms. SmartDisk Security, 813/263-3475.—D.L.

MS Project 4.0 Dresses for Office

ALTHOUGH MICROSOFT doesn't plan to include the new version of its project-management package, Project 4.0, in the Microsoft Office suite, the company has focused on making Project fit right into the Office box.

For example, you can take apart and reassemble version 4.0's menus in the same way as Word's and Excel's. It also has Wizards to help with complex procedures and to advise you to perform important but unobvious tasks, such as setting up a baseline; and the program includes Visual Basic for Applications (VBA), Microsoft's cross-application macro-programming language. Using VBA, developers can integrate Project with Excel, customize reports and views to conform to a specific industry's standards, and add new menu items and the code to make them run. Project 4.0 supports OLE 2.0 and Apple's publish-and-subscribe model, but it has weak AppleScript support—its commands and data objects are not open to AppleScript control. For managers of managers, Project 4.0 can merge multiple projects across a network.



Beyond Gantt: Project 4.0's calendar provides an easy-to-grasp look at task overlaps.

The new version should ship in January, to be followed within a few weeks by a Power Mac version. Microsoft is targeting a $475 street price. Microsoft, 206/882-8080.—D.L.

IN BRIEF

■ **Mainstay Regenerates MacSchedule** Mainstay has revised its scheduling and Gantt-chart utility, MacSchedule, and renamed it Plan & Track 3.5. The new version supports schedule dependencies between tasks and can display slippage and float on the Gantt chart. You can link projects hierarchically so an entire project can be summarized as a single bar in another project. Plan & Track can also calculate cost estimates and variances. It should be shipping now at $295. 805/484-9400.

■ **OCR Your Business Cards** The Umax subsidiary MaxSoft-Ocron has developed a Mac version of its MORE (Multiple Optical Recognition Engine) and is about to ship MORE-based business-card–reading software. MaxSoft says MORE is especially adept at distinguishing nonstandard field formats for entering business-card information into a database, and it can run inside Symantec's ACT contact manager. MaxSoft will bundle the software with a Umax business-card scanner for about $300. 510/252-0200.

■ **Workflow Control** SST (Small-Scale Ticketing) is a new workflow-management tool that evolved from a help-desk job-tracking system. SST shuttles work assignments around the network, keeping track of who is working on what task and forwarding tasks to the next person as each step is completed. SST has a point-and-click system for designing work forms; setting up routing, controls, and validation; and creating queries and reports. The system can also back up its database while it's being used. It costs $15,000 for an unlimited number of users. 303/534-9001.

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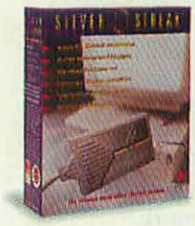

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Circle 89 on reader service card

BY JIM HEID

Working Smart

Surviving Software Upgrades

WHEN YOU THINK ABOUT UPGRADING your Macintosh, you probably think of getting new hardware (for an in-depth look at hardware upgrades, see "Making the Move to Power Mac," in this issue). But the big reason for upgrading hardware is to keep up with new software. When a new version of a favorite program comes out, it almost always demands more hard disk space, more memory, and more processing punch. Software evolution helps to drive hardware evolution, while evolving hardware enables new software.

Writing checks is only one price you pay for participating in this evolutionary process. Upgrading software leads you through a minefield of potential problems. Is the new version compatible with your hardware and system software? Can it convert your old documents accurately? How long will it take to learn the new features? And how many bug-fixes will ship before the new version really works? Stepping on any one of these land mines makes you want to scream, "This is *progress?*"

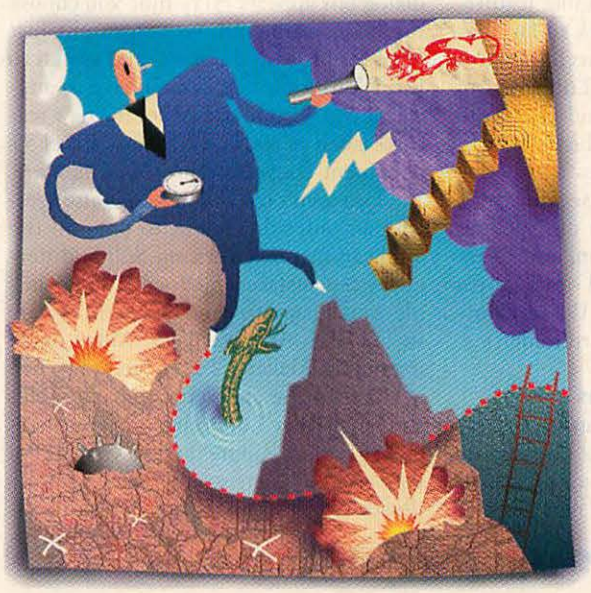
Upgrade confusion is always a burning issue, but lately it has become white-hot: Microsoft has released upgrades of Word and Excel—the Macintosh world's two biggest-selling programs—and numerous other companies have shipped new versions of widely used programs in the last few months. Power Mac support is the big reason for many of these upgrades, and the Power Mac's significant differences bring their own considerations to the upgrades table.

This month I help you pass safely through the software-upgrade zone. Along the way, I provide some upgrade-survival tips for Microsoft Word 6.0 and Excel 5.0—after all, they're the programs most business users must come to terms with. Most of the concepts apply to other programs as well.

Making Room on Disk

Like people, software tends to put on weight over the years. Microsoft Word 1.0 ran on a Mac with two 400K floppy drives; version 6.0, by comparison, ships—in compressed form, no less—on ten 1.4MB floppies. One way to fit massive new versions on your hard drive is, of course, to get a bigger drive; not only are hard disks that hold 500MB or more able to accommodate today's bloatware, but they're also faster than the smaller drives most Macs ship with.

If your bank account barks at this option, configure the upgrade's installer or setup program so it doesn't install unnecessary extras such as sample documents, templates, file-conversion filters, and help files (see "Smaller Installer").



Take Word 6, for example. The Typical install option stakes out about 13MB of disk space (15MB on a Power Mac), much of it for files you may never need, while the Compact option requires only 5MB (8MB on a Power Mac). You can also start out with the Typical installation and later purge pieces you don't use.

By the way, you should turn off system extensions before running an installer, because extensions such as virus-protection utilities can interfere with the installation. (To turn them off, restart your Mac with the shift key held down until you see "Extensions off" below the "Welcome to Macintosh" message.) As programs balloon, however, many are shipping on CD-ROMs, and your CD-ROM drive requires its own extension to run; if you disable all extensions when restarting, the CD won't mount. The only solution is to disable all but the CD-ROM drive extensions (some drives have more than one). That means you can't use the shift-restart trick, and this calls for an extension manager—either the Extension Manager control panel included with System 7.5, or a third-party product like Casady & Greene's excellent Conflict Catcher II 2.1.2 ($79.95; 408/484-9228, 800/359-4920).

Making Room in RAM

Fitting new software on your hard drive may be only half the battle; fitting it in memory is just as crucial. Programmers once prided themselves on writing compact, memory-conserving code, but these days many software companies have decided it's cheaper to ship flabby, oversize code and assume we'll buy more memory.

Nothing illustrates these trends better than the latest versions of Microsoft's programs—they are so RAM-hungry that the company bundles Connectix's RAM Doubler with Microsoft Office 4.2. Version 1.5 of RAM Doubler ($99; 415/571-5100, 800/950-5880) is a great program and a good stopgap measure for cramped RAM until you decide to add more real memory.

Another temporary remedy is to restrict a program's memory partition using the Finder's Get Info command.

continues

STEVE CAMPBELL

Word 6, for instance, has a preferred memory size of 3000K, but it runs (well, it walks) with 1700K. Decreasing the memory partition may slow down a program, but even walking is better than standing still.

Defaults and Dictionaries

A program you've configured and customized over time can feel as comfortable as an old pair of shoes. A new version, with its unfamiliar interface and different keyboard shortcuts, can give you digital blisters until you get used to it—or modify it to work like the old version. With many programs, you have to make those changes manually, but Word and Excel spare you from some of this labor. Word 6 can open and convert the settings file that held your Word 5 configuration. To do this, set Word 6's Open command to All Files (from the List Files of Type pop-up menu). Then double-click on the Word Settings (5) file, which is stored in the Preferences folder of the System Folder. Word 6 will offer to merge the settings file's options into the default template, called Normal. You'll probably have to do some minor tweaking to any custom menu settings you created, but you'll have a big head start.

Excel 5 doesn't have a similar feature, but it does let you backtrack to familiar territory by switching to Excel 4 menus: choose Options from the Tools menu, click on the General tab, and check the Microsoft Excel 4.0 Menus box.

To use your Word 5 custom dictionaries with Word 6, choose Word 6's Options command, click on the Spelling tab, click on the Add button, and select your old dictionary files. (Word 5 stores custom dictionaries in the Word Commands folder inside the Word folder.)

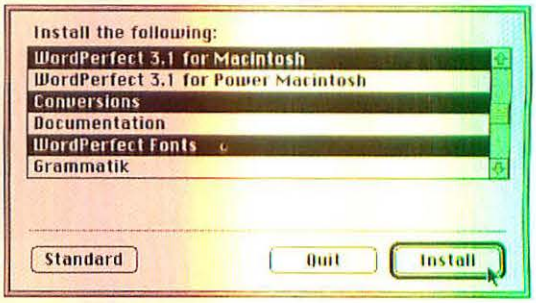
Compatible Conversions

Re-creating preferences can be a party compared with converting documents created with an earlier version of a program. When developers add new features to an application, they must often change the program's file format—the way it stores information about a document's text, graphics, and formatting—so that the document can contain work you do using features new to the new version. This file-format evolution can mean more work—or worse—when you open older documents with the latest version.

Most new software versions open an older document as a new, untitled document, thus encouraging you to save it in the new version's format. That's well and good, but it means you're likely to have two copies of each document on your hard drive. Some programs let you save over the older version to eliminate the duplicate, but many do not.

Word 6 handles old-document conversion with a bit more elegance: if you open a Word 5 document, it opens with the original file name intact. If you subsequently choose the Save command, Word 6 displays a dialog box asking if you'd like to retain the Word 5 format or save the document in Word 6. Alas, this dialog box appears every time you choose the Save command, so you might just want to throw in the towel and switch to the Word 6 format—you'll have to anyway if you want to use any of the new features, such as revision tracking. Excel 5's document-conversion process is similar.

You aren't out of the woods after getting an older document to open in the application's new version. Subtle differences can surface; in Word 6, for example, small caps are smaller than they are in Word 5. And last year, Aldus made many PageMaker 4.2 users go gray when it changed the character-spacing tables for PageMaker 5.0. Both of these changes can affect line endings and page breaks of converted documents. As these examples illustrate, upgrading your software halfway through a big project is asking for trouble. Stick with the old version until you reach a natural stopping point.



Smaller Installer You can save disk space by using the installer's option to leave out some components, such as help files and templates. Shown here is WordPerfect's installer.

When you upgrade an application and delete the older version from your hard drive, double-clicking on an old document may get you the "application not found" error message. All documents have invisible file-type and creator codes that tell the Mac which application is appropriate for that particular document. If the application's type or creator codes differ from the older version's, the document won't recognize the application. The workaround is to open older documents from within the new version or to drag the older documents to the new version's icon.

If you import documents into other applications—for example, Word files into PageMaker—you may encounter another document-format hurdle. Programs that import foreign files usually rely on converters or filters—files that describe a foreign format so the application can interpret it. If a program's file format changes, you'll need new converters to import its documents, and the converters may not be available right away. For example, as of this writing, neither Adobe nor Quark has released a Word 6 import filter. Until they do, save Word 6 documents either in Word 5 format or in Word 6 for Windows format—or stick with Word 5.

In the business world, document conversion usually means supplying files in a format your colleagues or clients can use. Again, until converters for the new version of a program become available, you'll need to fall back on a previous version's file format (for example, WordPerfect 3 can open Word 5 documents).

Power Mac Particulars

If you've recently acquired a Power Mac, you're probably in the process of upgrading your software library to native-mode versions. That comes with its own problems. The primary issue to consider is

continues

Utility Upgrade Snags and Solutions

Product	Problem	Solution
Adobe Type Manager	Older versions can slow a Power Mac.	Use version 3.8 or later on Power Macs.
Berkeley Systems' After Dark 3.0	Conflicts with System 7.5's Apple Menu Options control panel.	Turn off Remember Recently Used Items option.
CE Software's QuicKeys 3.0	CE Toolbox (included with QuicKeys) can cause freeze or crash.	Use CE Toolbox 1.7.2 or later (available on America Online).
PrairieSoft's DiskTop 4.5.1	Crashes when System 7.5's Apple Menu Options control panel is installed.	Remove Apple Menu Options control panel or use DiskTop 4.5.2 (upgrade free).
Symantec's Norton Utilities 3.0	Speed Disk 3.0 can damage data under some circumstances.	Use Speed Disk 3.1 (available on America Online).

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whether you'll be able to run your Power Mac software on 680X0-based Macs. If you use both types of Macs, be sure the upgrades include native-mode and 680X0 software. Many programs do include both, but for some you have to choose one or the other.

If you swap a hard drive or removable-media cartridge between a Power Mac and a 680X0 Mac, install fat-binary versions—that is, versions containing both native and 680X0 code—of your software. If a program supports a fat-binary install, this option is offered by its installer. You may have to choose a Custom Install option to access it, however; the Easy Install procedures generally install only the code for the machine the Installer is running on.

The Bleeding Edge

Once you've dodged the configuration and compatibility land mines and installed a new version, the real work begins: learning how the upgrade differs from its predecessor and mastering its new features.

Clearly, treading the software upgrade path can be a walk on the wild side. The easiest solution, of course, is to stick with the versions you're using. I know many casual Macintosh users who do exactly that; their Mac SEs are doing fine with Microsoft Word 3.1 and MacDraw II 1.1. But if you're a *Macworld* reader, chances are you're not a casual user, so not upgrading isn't a viable option.

Still, waiting to see if bug reports surface is the best approach. Unfortunately, many software companies, in their zeal to cash in on the lucrative upgrade market, discourage waiting by offering discounts to early upgraders. In this case, a better approach might be to install the new software but retain the earlier version, being careful not to save old files in the new format until you're satisfied with the new version (converting files from older to newer formats may be messy, but converting them back can be impossible). Ease into the new version over time, using it with less-critical projects at first. If a maintenance release is issued, make sure you get a copy—it's usually free. (Also check the vendor's online support forums for minor updates.) Staying informed is the best way to survive in the software-upgrade minefield. ■

Next month: Business information online and on CD-ROM

Contributing editor JIM HEID is the author and producer of the best-selling *Macworld Complete Mac Handbook Plus Interactive CD*, third edition, and the Macworld Ultimate Mac CD-ROM (both published by IDG Books Worldwide, 1994).

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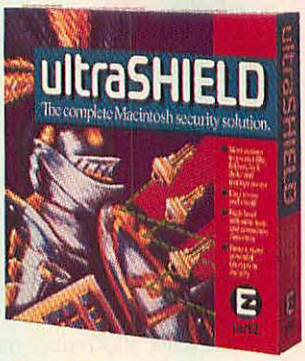

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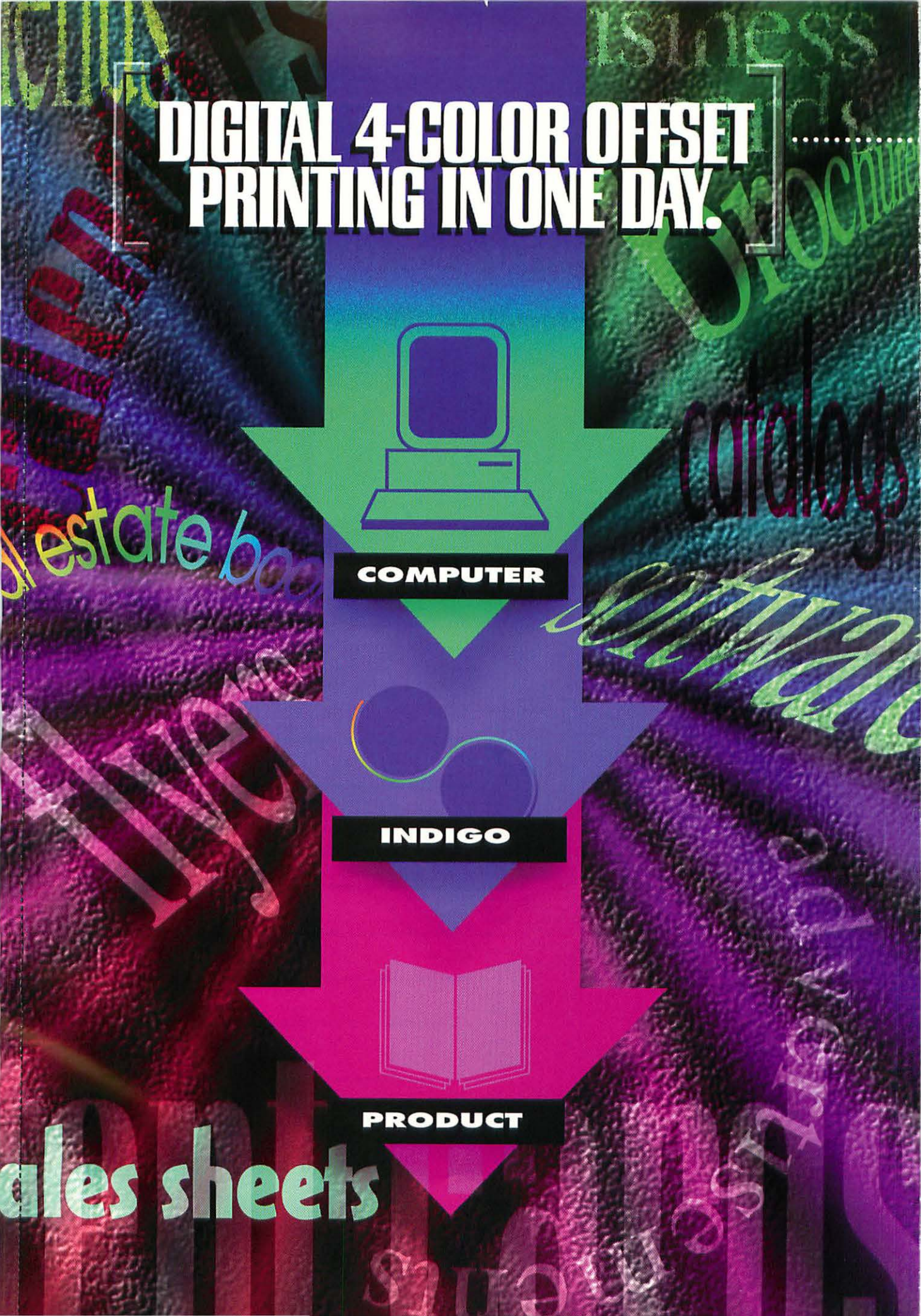

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C	City Color 7300 Ambassador Row, Dallas, TX 75247	214-951-9696
D	DiGiPrint 2917 N. Latoria Lane, Franklin Park, IL 60131 A Division of Tukaiz Press	708-455-DIGI
E	Digital Impressions 3115 S. 61 Ave., Omaha, NE 68106	800-584-9880
F	D.P.I. Digital Printing Inc. 2855 S. 160 th st, New Berlin, WI 53151	414-827-0808
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H	On Demand 421 Fairview Ave. N., Seattle, WA 98109 A Division of Color Service, Inc.	206-587-0800
I	Quality Control Color 4239 Piedmont Pkwy, Greensboro, NC 27410	910-292-1100
J	Speed Graphics 342 Madison Ave., New York, NY 10173	212-682-6520
K	Widen Direct Digital Printing 2614 Industrial Dr., Madison, WI 53713 A Division of Widen Color Graphics, LTD	608-222-1296

BY LON POOLE

Quick Tips

Tips, Tricks, and Shortcuts

JUST IN CASE YOU HAVEN'T DISCOVered System 7.5's unique form of the classic game Breakout, Steve Fenton of Orlando, Florida, describes how to start it from SimpleText: Type the words **secret about box**, highlight them, and drag them to the desktop (creating a clipping file). The game window appears, listing the names of the people who brought you System 7.5. Actually, you can start the game by dragging the secret words from any application that supports System 7.5's drag-and-drop editing, including Stickies, Scrapbook, Note Pad, and WordPerfect 3.1.

Broken Submenus

Q. When I choose an individual control panel from the Control Panels submenu in System 7.5's Apple menu, the System Folder opens instead of the control panel I chose. Other submenus in the Apple menu work fine.

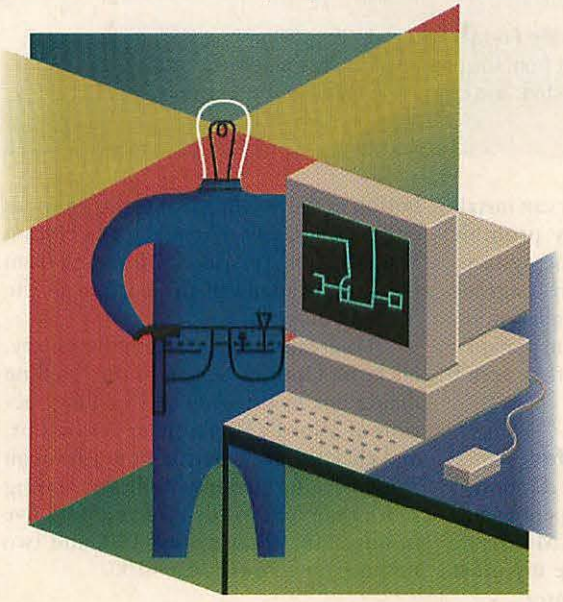
Scott Francis
Marietta, Ohio

A. When a problem like this occurred in prerelease versions of System 7.5, I fixed it by opening the Apple Menu Items folder, dragging the Recent Applications folder to the desktop, waiting a few seconds for the Apple menu to be updated, and then putting the Recent Applications folder back into the Apple Menu Items folder. You might want to give this a try.

In the released version of System 7.5, the Apple Menu Options control panel doesn't always show submenus for every folder (or folder alias). You can often fix several problem folders by dragging one of them to the desktop and back.

If these procedures don't work, your problem may be caused by a conflict between System 7.5's Apple Menu Options control panel and another control panel or extension. Certainly your System Folder should not contain other software that creates submenus in the Apple menu (for example, Now Menus or Kiwi Power Menus). The Safe Install program, which comes with System 7.5, identifies some items that might be in your System Folder and that conflict with standard System 7.5 extensions and control panels.

To test for other conflicts, restart your Mac while holding down the spacebar until the Extensions Manager window



DOUG ROSS

appears. In this window, choose System 7.5 Only from the Sets pop-up menu; then close the window to resume start-up. If the problem goes away, then one or more of the unchecked items in the Extensions Manager window conflict with the Apple Menu Options control panel. You can determine which items are troublemakers by a process of elimination using Extensions Manager. For more information on Extensions Manager, look up *extensions* in the Macintosh Guide (listed in System 7.5's Help menu).

If all else fails, try a clean install of System 7.5 as described in last month's *Quick Tips* (and in the manual accompanying the System 7.5 upgrade kit).

Power Mac, 680X0, and Fat Binary

Q. What about the poor soul who wants to use fast native software on a Power Mac but also wants to run the same programs on a 680X0 Mac such as a PowerBook? Is this person going to have to buy two versions of the same software, or will a native Power Mac program run on a 680X0 Mac?

Richard Hutson
Los Alamos, New Mexico

A. Software developers may offer any of several options. Both the 680X0 and Power Mac versions of a program may come in one box, with a smart-installer program that determines the appropriate version for each target Mac or lets you choose which version to install. With some software, you have the option of installing a single program file, called a *fat binary*, that contains both 680X0 and Power Mac versions. The fat-binary file takes twice as much disk space as a single-CPU version, but it's the best choice for file servers or external hard drives used with different kinds of Macs. A few software developers try to gouge out every buck they can by selling the 680X0 and Power Mac versions separately.

Before installing a program on more than one computer, read the software's license agreement. It may limit the num-

continues

IMPOSSIBLE COLUMN CHART

Here is a seemingly simple task: prepare a Microsoft Excel column chart that graphs two data series, each on a separate vertical axis. You might use such a chart to graph two series whose values were many orders of magnitude different, such as the total U.S. national debt and the per capita debt. If you try to create a combination chart, with both the main chart and the overlay chart formatted as columns, the columns graphed for one data series hide the columns graphed for the other data series.

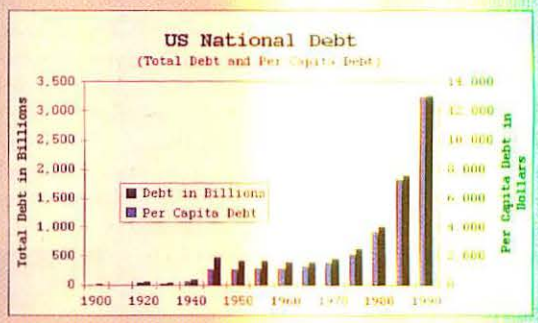
Shane Devinshire of Walnut Creek, California, suggests you solve this problem by inserting two series of dummy data (zeros) between the two real data series (columns C and D of the worksheet). In Excel 5.0, follow these steps to create the chart:

1. Select cells A1:E16 on the worksheet.
2. In the Insert menu, choose As New Sheet from the Chart submenu.
3. Click Next to go to the second step of the Chart Wizard.
4. Double-click the Combination chart type.
5. Double-click chart format number 2.
6. Click Finish (no need to get fancy).
7. Choose 2 Line Group from the Format menu and click the Chart Type button. Make sure the Apply To option is set to Line Group. Double-click the Column chart type.
8. You can modify the legend to suppress the display of the dummy data series. First, select the legend by clicking it once. Then click the name of the first dummy series (not the marker) and press ⌘-B. Repeat for the second dummy series.

	A	B	C	D	E
1		Debt in Billions	x	y	Per Capita Debt
2	1900	1	0	0	17
3	1910	1	0	0	12
4	1920	24	0	0	228
5	1930	16	0	0	131
6	1940	43	0	0	325
7	1945	259	0	0	1,849
8	1950	256	0	0	1,688
9	1955	273	0	0	1,651
10	1960	284	0	0	1,572
11	1965	314	0	0	1,613
12	1970	370	0	0	1,814
13	1975	533	0	0	2,475
14	1980	908	0	0	3,985
15	1935	1,823	0	0	7,598
16	1990	3,233	0	0	13,000

To get the column spacing shown in the sample chart, choose 1 Column Group from the Format menu, click the Options tab, and set Overlap to 0 and Gap Width to 150. Repeat with the 2 Column Group command. In Excel 4.0, follow these steps to create the chart:

1. Select cells A1:E16.
2. Choose New from the File menu, and select the Chart option (or press F11 on an extended keyboard).
3. Choose Combination from the Gallery menu, and select chart type number 2.
4. Choose Overlay from the Format menu. In the dialog box that appears, choose Column from the pop-up menu. Make sure the first Data View option is selected, and click OK to dismiss the dialog box.



ber of computers on which you can install the program, or it may flatly prohibit installation on more than one system. Most of the half-dozen license agreements I looked over allow installation on two different Macs (such as one person's work and home machines), if they aren't used at the same time.

Custom-Dictionary Transfer

Q. As a graduate student, I developed a custom MacWrite II spelling dictionary. How can I use it in Microsoft Word 5.1, which has become my most frequently used piece of software?

Daniel W. Dilks
Marlton, New Jersey

A. Start by opening the MacWrite dictionary file with Word. To do this, you must choose All Files from the pop-up menu at the bottom of Word's Open dialog box. Then use Word's Spelling command on the open MacWrite dictionary document. Word will stop at every entry it doesn't know in that document. By clicking the appropriate button in the Spelling dialog box, you can either ignore a word or add it to a custom Word dictionary, which you choose from the pop-up menu at the bottom of the Spelling dialog box.

To create a new custom dictionary, click the Options button in the Spelling dialog box to bring up the Spelling section of Word's Preferences dialog box, and click the New button in it. Although this procedure sounds tedious, adding more than 400 words took me only five minutes on a PowerBook 140, and two minutes on a Power Mac 6100.

Quicken Quick Print

TIP You may sometimes want to enter unpaid bills directly into a Quicken register instead of using Quicken's Write Checks command. Later you can print checks for the unpaid bills with the Print Checks command. To designate a bill as unpaid, type an asterisk in its check-number field. Quicken then enters the word *PRINT* as the check number. This works even if the QuickFill option is turned off (unlike the shortcut of typing *p*, described in the Quicken manual). If you want to reprint a check for an item that already has a check number, select any part of the number or click an insertion point in it (no need to select the whole number), and type an asterisk.

Lois Lewis
Troy, New York

Faster Rotated Pictures

TIP In our type shop and service bureau, we have noticed that a page containing artwork that was rotated in QuarkXPress can take as long as 90 minutes to print. The same page with art that was rotated in the original application and then placed in QuarkXPress prints in the normal time (2 to 5 minutes on a Linotronic). To speed up printing of pages that contain art rotated in QuarkXPress, follow these steps:

1. Place the unrotated art in QuarkXPress, rotate as desired, and note the degree of rotation.

2. Open the unrotated art in the application in which it was created (such

continues

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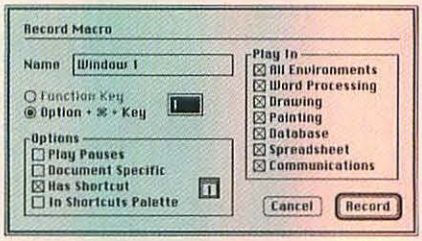


ClarisWorks Power Windows To set up a ClarisWorks macro that brings a window to the front at the press of a key combination, make settings like these in the Record Macro dialog box. Be sure to use a different number in the Name box of each window's macro, and use that same number for the option-⌘-*key* combination.

as Adobe Illustrator or Photoshop), rotate to the degree noted in step 1, and save.

3. Switch to QuarkXPress, update the art with the rotated version, and set its rotation to zero degrees.

Floyd Opperman
Farmington, Michigan

Magic Floppy Eraser

TIP You can reuse a floppy without taking the time to erase it or having to drag its contents to the Trash and then empty the Trash. Just open the floppy and drag everything into one folder at the floppy's root level. Copy the name of a folder you want to put on the floppy and paste the name onto the floppy's root-level folder. The Finder instantly replaces the root-level folder and its contents (which are the contents of the floppy) when you drag a like-named folder to the floppy and OK the folder replacement.

Tricia Sgrignoli
Helena, Montana

Window Switching in ClarisWorks

TIP Although ClarisWorks does not offer keyboard shortcuts for switching between windows, you can create your own by recording a set of simple macros (one for each window). Follow these steps:

1. Open any ClarisWorks documents, create new documents, or make new views until you've opened the maximum number of windows you usually work with.

2. Start recording a ClarisWorks macro by pressing ⌘-shift-J and filling in the Record Macro dialog box (as shown in "ClarisWorks Power Windows").

3. Choose the first window listed at the bottom of the View menu.

4. Repeat steps 2 and 3 to create a macro for each window listed in the View menu, changing the number in the name and keyboard shortcut for each macro.

Now you can switch to any ClarisWorks window by pressing three keys at once: ⌘, option, and the number of the window you want to activate. You can make each window a mouse-click away by adding your macros to the Shortcuts palette. Customize each macro's button as described in the ClarisWorks manual.

A. Tanaka
British Columbia, Canada

Sound Follow-up

A drawing in August's *Quick Tips* shows how to use an ordinary stereo patch cord to connect an audio source to the sound-input jack of an AV or Power Mac. Alan Kobayashi of Los Angeles wants to know if this means that a Mac's sound-input jack accepts two audio sources at the same time (stereo signal). He also wonders whether the jack is designed for a line-level or mike-level signal.

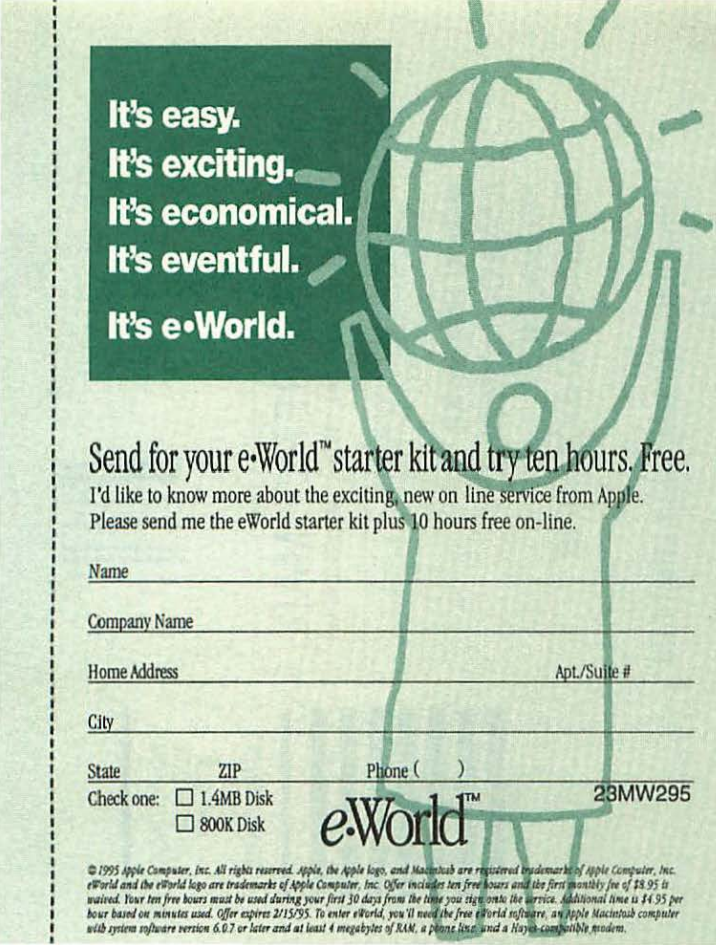
The following Macs have a line-level sound input (2V maximum, 8000-ohm impedance): all Power Macs; the Quadra 605, 630, 660AV, and 840AV; the LC 475, 575, and 630; and the PowerBook 500 series. These Macs require an amplified microphone, such as Apple's PlainTalk mike; or you can connect a line-level audio source such as a VCR, audiocassette deck, or audio CD player.

All other Macs have a mike-level sound input (20mV, 600 ohms). To avoid overloading the mike-level sound circuitry with a line-level source—which would probably distort recorded sound but cause no damage—you should use a special cable that attenuates the high-level signal (for example, Sony RK-G128 or Radio Shack 42-2461-A).

The 660AV, the 840AV, and *all* Power Macs can digitize a full stereo signal—a left-channel signal and a separate right-channel signal. If you want to adjust the mix of the two channels, you'll need extra software, such as Macromedia's SoundEdit16. All other Macs digitize a monophonic signal (even a Quadra 900 or 950 has left- and right-channel input jacks but mixes the two stereo channels into one signal). ■

We pay from $25 to $100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).



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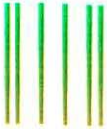

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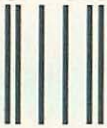

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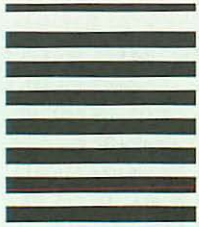

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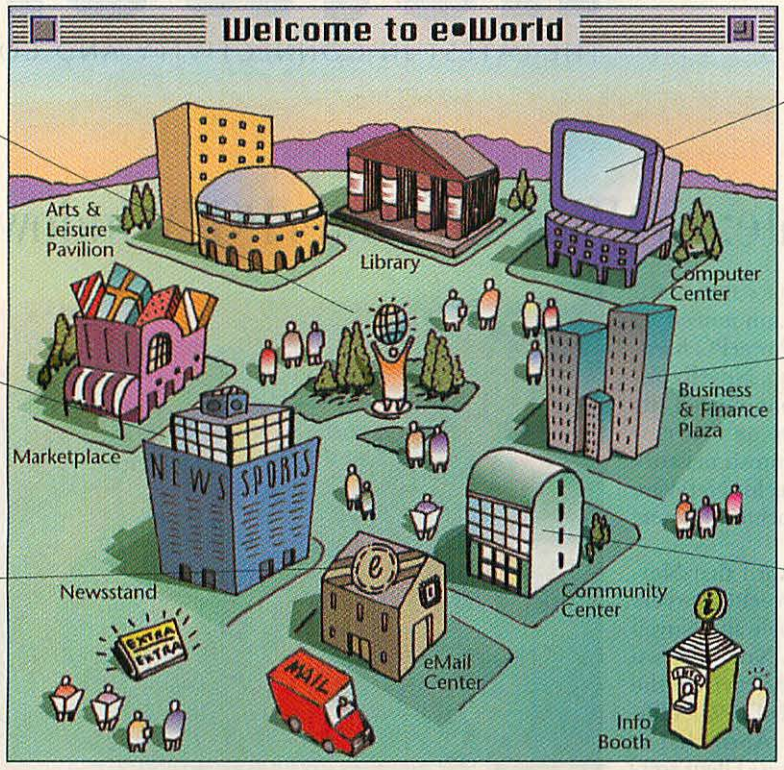

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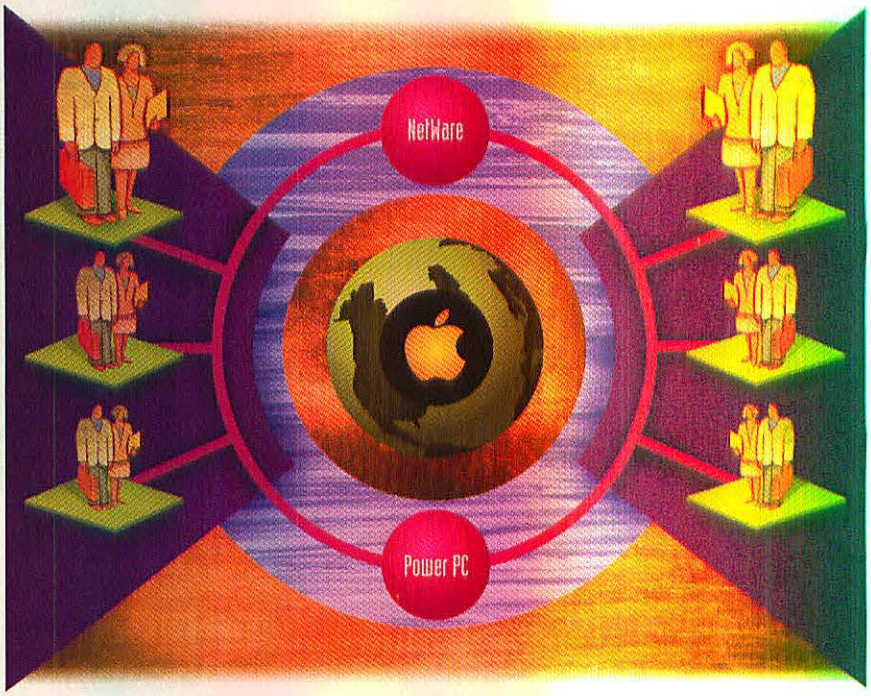
Apple Update: NetWare on PowerPC, Windows Clients



JOHN RITTER

WHEN APPLE, IBM, AND Motorola announced a converged PowerPC hardware platform, Novell concurrently announced its intention to run NetWare on that new platform. However, Macintosh network managers have been waiting for NetWare to run on any PowerPC machine for quite some time.

By announcing last April that NetWare would run on PowerPC servers before the end of 1994, Apple and Novell set an ambitious agenda. Now the two companies have officially revised the release date to the first half of 1995. Additionally, Apple said last April that it planned to develop Windows client software for AppleShare, AppleSearch, and Apple Remote Access; expect to see the first of these products in early 1995.

NetWare on PowerPC

Novell says that changing its primary reference platform—from the Hewlett-Packard PA RISC platform to the PowerPC—delayed development but indicates its commitment to the PowerPC. Also, the project competed for Novell resources against NetWare 4.1 for the Intel platform, which was slated to ship in December 1994.

The good news: NetWare 4.1, on both the Intel and PowerPC platforms, will allow Macintosh clients to participate natively in NetWare's global directory services for the first time (the older version of NetWare, 4.02, uses bindery emulation). Using directory services, a user can log in to the directory once and be connected to multiple servers. Users access the directory through a browser interface, which displays servers and objects on the network.

The bad news (for Mac-centric administrators): the management application for directory services will still run natively only on a Windows PC.

While the directory services will run via the NetWare Core Protocol (NCP) over IPX, NetWare 4.1 for PowerPC will still require AppleTalk because it will continue to use AppleTalk Filing Protocol (AFP) for file sharing and Printer Access Protocol (PAP) for printing. Future versions will allow Macs to access file and print services via NCP.

With version 4.1, Novell will bundle MacIPX and NetWare for Macintosh client software with NetWare for the first time. Macintosh users will no longer pay an extra fee per user; they'll pay just for the concurrent-user server license.

While Novell is licensing NetWare to Apple, the companies' joint-development effort includes Apple's providing a NetWare user interface that's specific to Apple hardware. Initially, NetWare for PowerPC will run on the Workgroup Server 6150, 8150, and 9150. Gearing up for the transition to PowerPC-based servers, Apple recently lowered the price on these three servers, which are all based on the PowerPC 601 processor, and discontinued the 68040-based Workgroup Server 60 and Workgroup Server 80.

Apple is also working with third-party developers to port their NetWare Loadable Modules (NLMs) to the PowerPC platform. Once ported, the NLMs will also run on the new PowerPC platform, according to Apple. In November, Apple was working to release an updated software-developers' kit to vendors and an early alpha version of NetWare for PowerPC to 30 customers.

Apple will sell NetWare for PowerPC through Apple-authorized dealers

who are also Novell-authorized resellers. Pricing had not been determined at press time.

Windows Update

Last April, Apple stated that it would provide DOS and Windows client software for AppleShare, AppleSearch, and Apple Remote Access. While Windows' dominance in the PC market makes it unlikely that Apple is devoting resources to DOS products, the Windows products are moving closer to fruition. Apple expects to ship an AppleShare client first, with other clients to follow, in early 1995. The AppleShare client will allow Windows users to access AppleShare servers and use AppleTalk printers; it also will allow Windows PCs to mount local Mac drives for peer-to-peer file sharing. The Windows client for AppleSearch will perform the same functions as the Mac version. Pricing was not set at press time.

Apple licensed Miramar Systems' 32-bit Windows virtual device driver (VxD) AppleTalk protocol stack with the option to include it in Windows products Apple is developing. Miramar already sells Personal MacLAN Connect software, which allows Macs to mount PCs on their desktops and allows bidirectional cross-platform printing. Miramar will add the Windows AppleTalk client to version 5.0, making it a cross-platform peer-to-peer networking solution. Personal MacLAN Connect 5.0 will cost $199 per PC and will ship in the first quarter of 1995. Apple Computer, 408/996-1010; Miramar Systems, 805/966-2432; Novell, 801/429-7000.—E.D.

The Printing Picture

TO BRING ETHERNET CAPABILITY TO all of its workgroup printers, Apple Computer has begun to bundle LaserWriter Bridge software with the LaserWriter Select 360 ($1599) printer. Co-developed by Sonic Systems and Apple, the software uses a Mac as a LocalTalk-to-Ethernet bridge.

A hardware adapter, Sonic Systems' microPrint is also available as a $259 option from Apple. Sonic Systems also makes 2-port ($299) and 12-port ($399) microPrint bridges.

Farallon Computing's EtherWave MultiPrinter Adapter ($349 estimated street price) makes it possible to connect a string of up to eight LocalTalk printers to a 10BaseT network. The LocalTalk printers connect to one another with PhoneNet connectors; the last printer in the chain connects to the MultiPrinter adapter, and the adapter daisy-chains to the network through its two self-terminating RJ-45 connectors.

Apple Computer, 408/996-1010; Farallon Computing, 510/814-5000; Sonic Systems, 408/736-1900.—NANCY E. DUNN

TOM GIBSON

Farallon's EtherWave connects multiple LocalTalk printers to an Ethernet network. Sonic Systems' microPrint, available from Apple, also acts as a LocalTalk-to-Ethernet bridge.

ATM Arrives for NuBus

NETWORKED MACINTOSH USERS who can't wait for PCI-bus Macs to improve file-transfer speed may rejoice that Fore Systems has made good on its promise to deliver asynchronous transfer mode (ATM) NuBus adapter cards.

Other card developers plan to wait until the PCI-bus Macs arrive; the PCI bus will be able to take advantage of more of the ATM's 51-Mbps-to-1.2-Gbps speed potential than the existing NuBus can. Fore Systems bargains that some customers will find worthwhile the incremental speed gains possible for NuBus machines equipped with Fore's NBA-200 adapter cards. The cards fit in NuBus slots in any Quadra, Power Mac, or Workgroup Server and work with Fore's family of ATM switches to get workgroup LANs moving at speeds up to 155 Mbps.

The cards come with ForeThought LAN Emulation software that lets existing network applications run without modification over the new ATM network. The software also enables the ATM network to work seamlessly with Token Ring, Ethernet, or FDDI LANs.

A card costs $1595 with a UTP interface or $1695 with a multimode fiber interface. Fore Systems, 412/772-6600.
—MARTHA STRIZICH

IN BRIEF

■ **Mini PhoneNet** Farallon Computing is shipping the PhoneNet Pocket Connector ($12.99 list), designed for mobile users who need to plug into LocalTalk networks. Smaller than a key chain, the preterminated connector fits the mini DIN-8 printer port or communications port of a Macintosh, Newton, or LocalTalk printer. 510/814-5000.

■ **Internet Links for E-mail** HoloGate software, which provides Internet access for Softarc's FirstClass, now offers modules for CE Software's QuickMail, Microsoft Mail, Casady & Greene's SnapMail, and ResNova's NovaLink, as well as UUCP. The modules link the E-mail packages to each other and to the Internet. The software simplifies file transfer by automatically encoding and decoding files in an appropriate format. HoloGate costs $500 for the first two modules, then $500 per module. Information Access Technologies, 510/704-0160.

Wireless LAN Advances

APPLE COMPUTER, EXPLORING WIRELESS LAN options in its Advanced Technology Group, has codeveloped a spread-spectrum, frequency-hopping radio and an RFMAC protocol with GEC Plessy Semiconductors (GES). Apple's ATG is conducting field trials of the prototype technology, which uses the 2.4GHz to 2.5GHz ISN band.

To overcome increasing background noise on this mixed-use band, the radio transceiver makes fast hops between frequencies, and the controller software breaks the packets into small fragments that its error-correction software can rebuild if three out of five fragments arrive intact. Apple will license the technology to other developers; the company says it's too early to predict what wireless LAN products Apple might market under its own name.

GES offers the radio itself to OEM companies in volume purchases.

Apple Computer ATG, 408/974-3078; GEC Plessy Semiconductors, 408/438-2900.—NANCY E. DUNN

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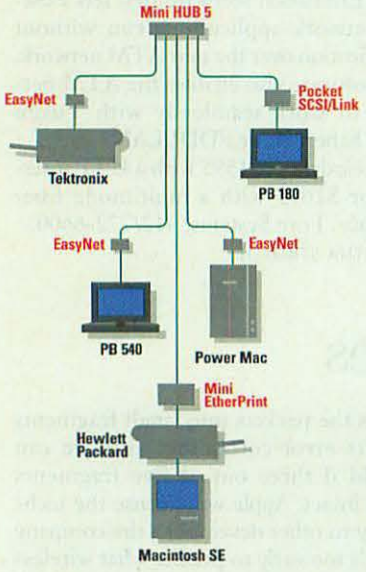

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Circle 161 on reader service card

BY CARY LU

PowerBook Notes

Upgrading Your PowerBook

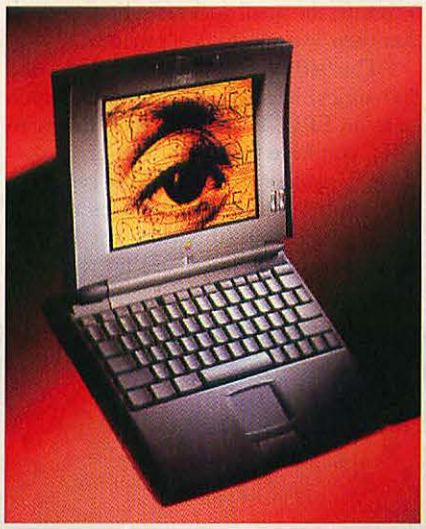
POWERBOOKS WERE DESIGNED FOR three kinds of upgrades: RAM, a higher-capacity hard drive, and a modem. Here I focus on other, less routine upgrades.

CPU Upgrades

Nearly everyone wants a faster computer, and the obvious route is through a faster central processing unit (CPU). The most common method boosts the system clock (oscillator) without changing the CPU itself. The PowerBook 140's 16MHz CPU runs at 25MHz, and a 25MHz processor increases to 33MHz. The cost, depending on the model, ranges from $250 to $400. Although a boosted CPU runs faster than its rated speed, upgrade vendors report very few problems.

Digital Eclipse Software (510/547-6101, 800/289-3374) and Dynamic Engineering (408/336-8891) offer clock boosts for PowerBooks that you send to them. Alternatively, Digital Eclipse can send you a replacement processor board that you can install yourself (or you can have a local service center do it). You then return your old processor board to Digital Eclipse for credit. Bottom Line Distribution (512/892-4070) also offers a clock boost, but only for the 140 and the Duo 210.

Dynamic Engineering does not offer a replacement board but offers as an option a faster CPU. The additional $80 to $150 for a new CPU may buy you some peace of mind, but in practice it isn't necessary: Dynamic Engineering can boost any PowerBook that has an 030 CPU, including Duos and other models with a 33MHz 030 processor. Dynamic says nearly all such PowerBooks will run at 37MHz, more than half reach 38MHz, and 10 to 15 percent make it to 40MHz.



Price is determined by the final speed, with a $100 minimum.

Dynamic plans to offer a 33MHz 68030 upgrade for the Mac Portable (discontinued in January 1991). The Portable uses a heavy, high-capacity battery, so such an upgrade would not create a serious power problem. Dynamic also plans to offer faster modems and improved video outputs for the Portable.

In addition, Dynamic is considering offering the same 33MHz 030 upgrade for the PowerBook 100. A faster processor will make an external battery almost a necessity for the 100, and this would offset the machine's light weight. The 100 is quite difficult to upgrade, since a new processor requires a new circuit board with the ROMs transferred from the old board, which would make it costlier than other 100-series upgrades.

Of all the 030 PowerBooks, only the Duo 250 and 270c are upgradable to an 040 processor (to a 280 and 280c, respectively) for $899 through an Apple dealer. For the PowerBook 520 and 520c with a 25MHz LC040 processor (which lacks a floating-point unit; see below), Dynamic Engineering offers its $449 CPU 33+ upgrade to 33MHz operation; the upgrade replaces the original CPU with a 33MHz CPU that includes a floating-point unit. At press time, Dynamic Engineering was testing for possible speed boosts to the Duo 280/280c and PowerBook 540/540c, which normally run at 33MHz; contact the company directly to get the test results.

Apple says that its PowerPC upgrade for all Duos—including the 210 and 230—and 500-series models will be available in the first half of 1995, with prices starting at under $1000. The RAM cards and modems in existing Duos and 500-series PowerBooks will be usable with the PowerPC upgrade as long as they meet Apple's specs; most do (see "Making the Move to Power Mac," in this issue). A PowerPC upgrade provides a much greater performance increase than any clock boost, providing you use Power Mac–native software. Software designed for a 680X0 CPU will run faster on an 040 Mac than it will on a Power Mac. PowerPC upgrades for 100-series PowerBooks are technically possible but unlikely, given the cost and difficulty of retrofitting such old models. Apple has made no announcement on this matter.

Do CPU Upgrades Make Sense?

Going from 25MHz to 33MHz is a 32 percent speed improvement. (Dynamic Engineering's literature misquotes this as 132 percent.) If you work purely from a

continues

MARK JOHANN/SCREEN IMAGE: CARRY GAY/IMAGE BANK

RAM disk that contains a System Folder and applications, you will get the full 32 percent. But if you allow for the hard disk—which still runs at the old speed—the net improvement is typically about 20 percent, useful but not significant. And going from 33MHz to 38MHz is a mere 15 percent boost.

A faster processor consumes more power; if you double the speed, the CPU requires four times the power. Fortunately, processor cycling minimizes power consumption. Nevertheless, if you boost the clock, you should also get higher-capacity batteries.

The PowerPC upgrade significantly boosts performance, but the other clock boosts are much more modest and don't make a lot of sense in strictly economic terms. Boosting a PowerBook does not add proportionately to its resale value. In most cases, you're better off selling your PowerBook and buying a newer model that's likely to offer additional features as well as a faster processor.

Floating-Point Units

A floating-point unit (FPU), also called a math coprocessor, speeds up some mathematical calculations. Few programs need an FPU; even spreadsheets gain little, unless you frequently use trigonometric functions or transcendental math (x^y, for example). Math programs gain the most from an FPU; CAD (computer-aided design) and 3-D modeling and rendering—the other common applications that rely on an FPU—are rarely done on a PowerBook. You can have a 68882 FPU chip added to a PowerBook 140, 145, 160, or 165 (the 165c, 170, 180, and 180c already have an FPU; and the 145B has no space to add one). Both Digital Eclipse and Dynamic Engineering will install an FPU—usually as part of a processor boost—for an additional $70 or so.

The 030 Duos (210, 230, and 250) can use an FPU installed in the full-size Duo Dock and Duo Dock II—the Duo 270c has a built-in FPU—but the docks are hardly portable. For $349, Sigma Seven Systems (604/743-2416) hand-solders an FPU inside the Duo, the Floppy Drive Adapter, or another small dock. Installation in a dock means you don't have to modify the Duo itself and preserves its warranty; the small docks are cheap enough that their warranties don't matter.

The 040 PowerBooks (280, 280c, and 500-series) have an LC040 CPU, which lacks an FPU. If your software needs an FPU, you have three choices:

- Unsolder the LC040 and replace it with a full 68040, which includes an FPU in the single chip (this voids the PowerBook warranty). There are no technical problems aside from somewhat shorter battery life; Apple's ROMs already support a full 040. As described earlier, Dynamic Engineering's $449 upgrade replaces the LC040 CPU in the 280, 280c, 520, 520c, 540, and 540c with a full 040 processor, which includes an FPU. According to Apple, though, only the 25MHz LC040 CPUs (the 520 and 520c) are candidates for replacement; a full 040 on the 33MHz models would exceed Apple's heat-dissipation guidelines, and the PowerBooks have no space for a fan or a larger heat sink.
- For under $200, Sonnet Technology (714/261-2800, 800/945-3668) puts an FPU on a PDS card for 500-series PowerBooks. The card fits in the left-side battery compartment, so you cannot use a second battery or a PCMCIA adapter while the card is in place. The Sonnet FPU is a standard 68882 chip, the kind used by 030 CPUs; an LC040 combined with a 68882 is a nonstandard configuration that may not work with all software.
- SoftwareFPU 3.02, a $10 shareware program from John Neil & Associates (800/663-2943), makes the application software think that an FPU is present, but it does not speed up mathematical calculations. The early LC040 Macs were not compatible with Software-

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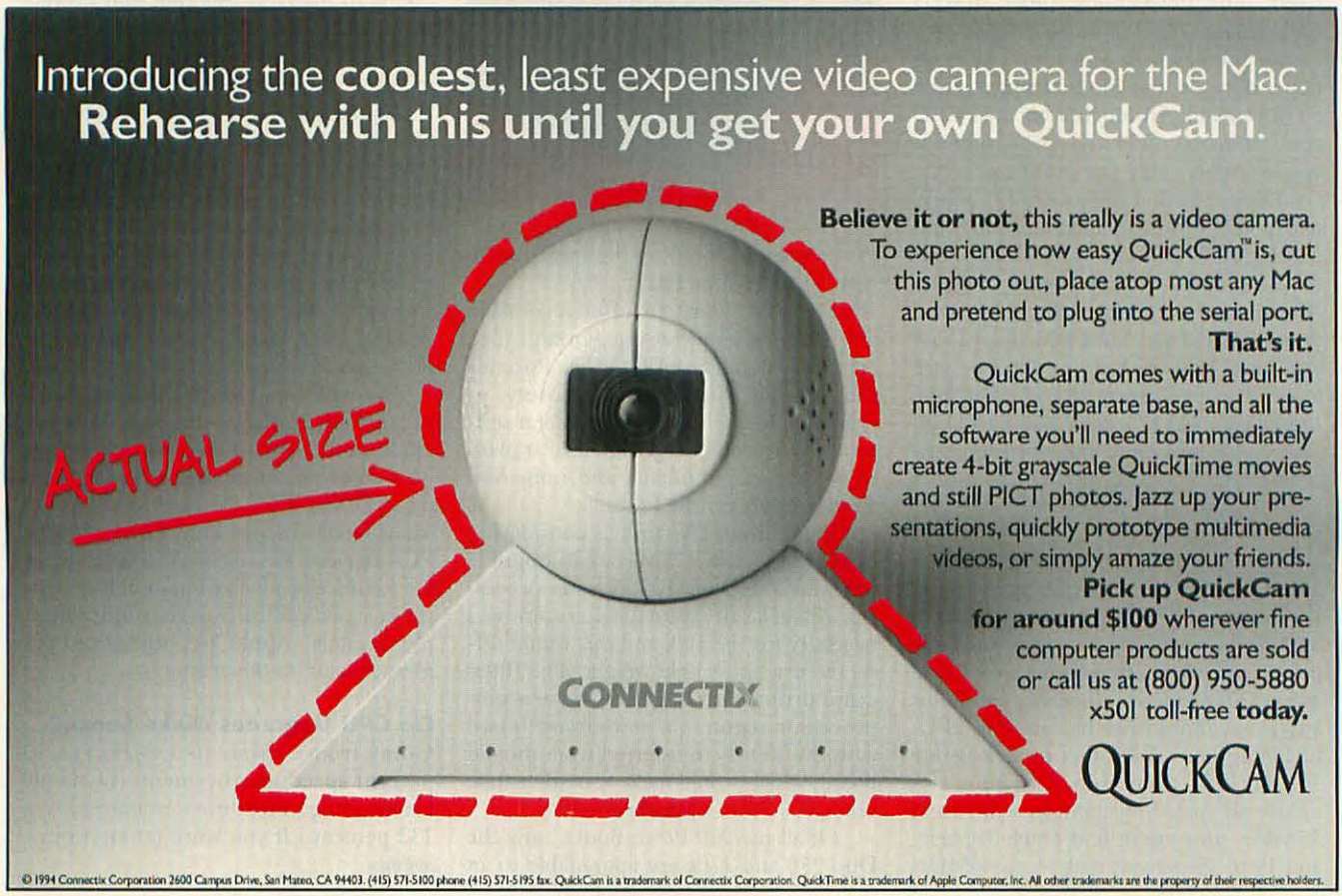

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FPU; newer ones should be compatible. SoftwareFPU also works on 030 Macs that lack an FPU, including PowerBooks.

Screen Upgrades

For the PowerBook 520, 520c, and 540, Apple offers upgrades to the color active matrix screen of the 540c. For about $2200, all you get is a new screen; the CPU speed does not change. For other PowerBooks, screen upgrades are not usually practical. Apple does not supply active matrix screens—monochrome or color—as service parts in North America. Apple replaces only defective active matrix screens, so unless you happen onto a loose screen from a PowerBook that was damaged in some other way, you cannot upgrade. (Two years ago, Newer Technologies showed an active matrix color screen upgrade for the 170. Although one magazine described the screen as "currently shipping," only one prototype was ever made—and it was stolen.)

The PowerBook 140, 145, and 170 lack a video port for an external monitor. Only Power R (206/547-8000, 800/729-6970) still offers a direct connection: its $299 model PB-10, which adds a half-pound external box and supports a black-and-white (1-bit) VGA display in mirror mode only (the internal and external monitor show the same image).

Discontinued internal cards from Envisio, Mirror, and Computer Care support a range of color monitors. And you can still find the sluggish video adapters that connect to the SCSI port. Note that none of these video interfaces work with a PowerBook 150. In reality, there is only one good way to get video if you have an older PowerBook or a 150: sell it and get a model with a video port.

Battery Upgrades

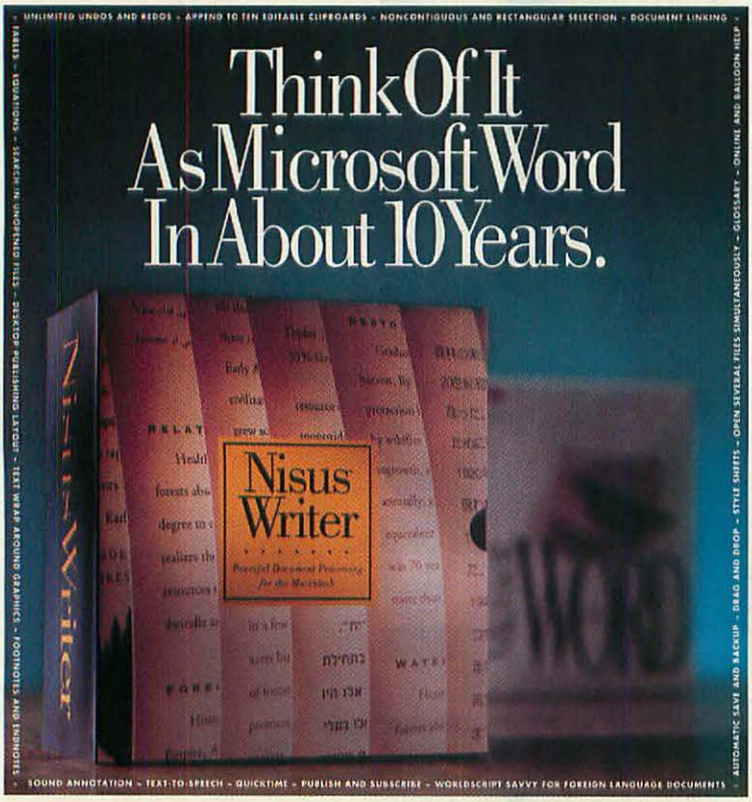
If you have an older 100-series PowerBook, you can get higher-capacity batteries and heavier-duty AC adapters. Apple shipped 24w AC adapters (M5652) with the 165c and 180c; they charge faster than the older 15w (M5140) and 19w (M5651) adapters. Exception: the PowerBook 100 and 150 should use a 15w or 17w adapter (APS-17adp), since higher-power adapters may cause damage. The Duo 1.5-amp AC adapter (M2693)—supplied with the 270c, 280, and 280c—charges faster than the 1.04-amp adapter (M7783) supplied with older models. Owners of 500-series PowerBooks should get updating software, such as the $10 EMMpathy from VST Power Systems (508/287-4600) and Battery Utilities 500 Lite from Lind (612/927-6303; 800/659-5956), to fix common problems with batteries. Apple plans to release its own battery-update software.

More Duo Upgrades

The earliest Duos included a stiff and clunky keyboard (the A model). Most Duo 210's and 230's, including the closeout units sold in recent months, use the improved B keyboard. The C keyboard was the first good one; Apple now ships model E. A replacement keyboard costs about $150 installed—a good investment. Apple replaces keyboards under warranty only if they are demonstrably defective. Some people recommend replacing the magnesium frame, or case stiffener, in older Duos with a newer model's frame (for about $170 installed) to improve keyboard action. I've compared C-keyboard Duos with the old and new frame and can't tell the difference. Apple says the change in the stiffener simply improves the heat dissipation for faster Duo models.

For about $600, you can upgrade the original full-size Duo Dock to the newer Duo Dock II with built-in Ethernet and improved video support. For $200 to $300, you can install NuBus cards in the original Duo Dock to add Ethernet and even better video support, but this uses up both slots unless you get a combination board by E-Machines. **m**

CARY LU is a *Macworld* contributing editor who covers mobile- and remote-computing issues in this monthly column.



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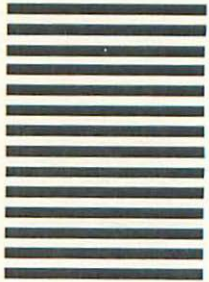

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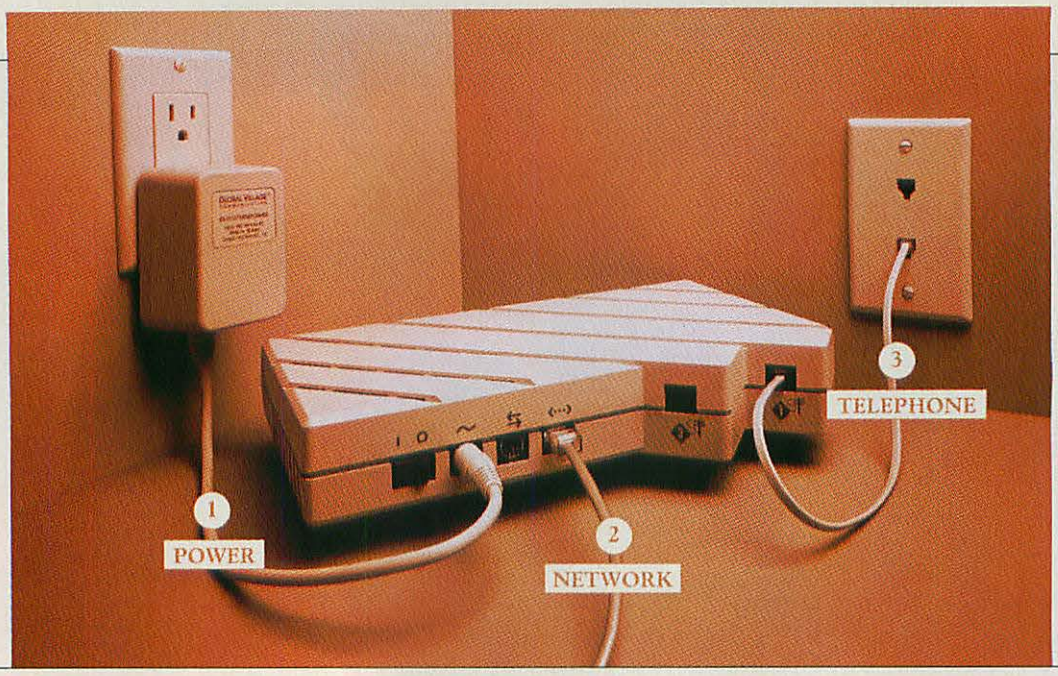

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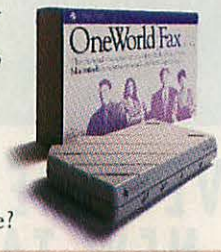

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BY DAVID POGUE

The Screen-Saver Myth

Get a screen saver—but not to save your screen

THE MYTH LIVES ON. THE After Dark box still says: "When you leave your computer on but unattended, images burn in to your screen, causing permanent damage."

According to the engineers I interviewed, it's "virtually impossible" for a static image to burn into a color monitor. (It has to do with the fact that there are three color dots for every pixel on your screen.) They told me you'd have to leave your monitor on, and untouched, for *years* before you'd see any damage.

Black-and-white screens can burn in images—if they're left on for months. But ironically, many of today's screen savers don't work in black-and-white. (No PowerBook screen can burn in images permanently, either.)

No, the point of screen savers is not protection. It's entertainment and showoff value. How else can you make the Mac strut its audiovisual stuff for $25?

In an attempt to erode After Dark's domination of phosphor real estate, dozens of competitors have emerged. They cater to every pop-culture icon from pro football to the Flintstones. Screen savers have become the bumper stickers of the information age.

Kids World 1.01

Kids World lets you make your *own* screen savers ($30, Bit Jugglers, 415/968-3908). You choose a scenic backdrop (seven are provided, or you can use any PICT file). Then you stamp any of 100 different cartoony characters into the scene. Click on the Go button, and each character becomes animated, walking or rolling across your backdrop and making the appropriate delicious sounds. Many of these elements interact; if you position them a certain way, your cat fights your dog, and your caveman falls into your tar pit. Considerable hilarity stems from putting characters into the wrong backdrops—making the goldfish, for example, leap out of a moon crater.

You can save your animated scene as an After Dark module, or you can use it with the included UnderWare screen-saver control panel. A thousand clever touches—and good, solid programming—make this world well worth visiting.

UnderWare 1.0.1

This ingenious software's claim to fame isn't how it blacks out your screen. It's how it *doesn't* black it out. In other words, this screen nonsaver uses your desktop (icons, folders) as its witty playing field. Robbers blow holes in the desktop and steal your microchips; folders sprout legs and run merrily away.

Because most of the modules don't blacken your screen, you wouldn't buy UnderWare for protection even if you believed in burn-in ($30, Bit Jugglers, 415/968-3908). You'd buy it for the visual jokes. Unfortunately, as with verbal

jokes, the amusement plummets with repetition. (Moreover, 7 of the 29 modules are Kids World scenes!) You'll definitely want to trot out UnderWare for visiting friends. But when working solo, I'm guessing you'll want it NoWare.

Bliss Saver 1.0.3

This amazing program defies description. It's a visual synthesizer: as wild shapes and patterns shimmer and metamorphose on your screen, you can control their speed, colors, and shapes by pressing certain keys. More than 140 modules (displays) await, all similarly abstract and soothing, plus any you care to design for yourself ($49.95, Imaja, 510/526-4621).

Bliss is an application, not a control panel. Downside: it can't come on when, for example, there's a dialog box on the screen. Upside: no start-up conflicts. And you can quit it when you want to reclaim the memory.

It's tempting to "play" this visual instrument while talking on the phone. Only trouble is, you can lose yourself in its silent, wild rivers of color. You're likely to wind up slack-jawed and drooling while your phone pal hangs up in disgust.

Opus 'n Bill, Far Side, Flintstones

Delrina Corporation is the most direct challenger to the After Dark empire. Its screen-saver lineup ($39.95 each; Flintstones $34.95) works precisely the same way: all of its specialty screen savers include the same control-panel engine (408/363-2345).

I confess: I've never considered "The Flintstones" a comic masterpiece. The movie was even unfunnier. Water down the concept further—a mirthless screen saver—and you've got a pretty pointless program.

Opus 'n Bill, based on the "Bloom County" comic strip, at least gets reactions. Seven of its 16 modules are butt, underwear, or flatulence jokes. A few of the others are laugh-out-loud funny; but overall, a more splat-and-belch sensibility replaces the subtler tone of the comic strip.

The 14 Far Side modules, though, are almost uniformly hilarious. For some reason, the silent, passive ambience of a screen saver is well suited to Gary Larson's twisted cartoon world of bespectacled amoebas and chain-smoking dinosaurs. And there's only one flatulence joke.

Finally, there's Dilbert. My local paper (the *New York Times*) doesn't run

continues

GORDON STUDER

this comic strip. But having seen this screen saver's 16 witty satires of corporate 9-to-5 stupidity, I wish it would.

DTS Screen Saver 3.0.3/ ScreenSavor

This application's sole talent is displaying one PICT file after another (DeskTop Software, $39.95, 203/741-8535; also marketed as ScreenSavor, $29.95, MIFP Development, 503/292-0362). It's the slide-show screen saver. MIFP sells $9.95 sets of photos to plug in: space, golf, skiing, and so on. DeskTop sells $39.95 kits featuring nature, Marilyn Monroe, and others. You can specify how fast the slides appear and what kind of dissolve you want between them.

You can't, however, specify that the software be well designed. Why should it take 25 setup steps before the screen saver is ready to use? Why on earth must you assemble the folder full of PICT files into an album file yourself? Why do my cursor and menu-bar clock shine through the blackness? Why is the interface so tiny and confusing? Until these questions are answered, this new screen-saver engine will have a tough time revving up.

Now Fun 1.0.1

More and more screen savers don't even *pretend* to protect the screen. Take, for example, the UnderWare and After Dark modules in which animated characters mess with your Mac's icons. Meanwhile, the desktop and menu bar sit there, burning away.

Now Fun's modules remain true to their ostensible purpose. There are 31 typical displays: colorful geometric patterns, graphics or movie players, bouncing athletic equipment, and so on.

Of course, the main point of Now Fun is the value: in the same package, you also get a desktop picture installer, 100 sound files, and an interface colorizer. Not a bad deal for $29.95 (Now Software, 503/274-2800).

Lights Out Sports Fans 2.1

Only a truly rabid fan could enjoy this crude piece of work ($30 street price, Quadrangle Software, 313/769-1675; each sport or league sold separately). It's not just that the graphics are simplistic and two-dimensional, nor that the endlessly repeated sound effects grate on your brain; it's the IBM-ness of it all. Every speck of this control panel—nonstandard buttons, lists, text boxes—indicates it was hastily adapted from the PC version. Makes you glad to have a Mac.

Once you get it all going, you see sports-related visuals: your favorite team logo bounces around the screen, or crowds do "the wave," or IBM-ish fireworks go off. The highlight is the actual sports action, where you watch a top-view diagram of your favorite teams doing battle. Unfortunately, the players are represented by big logos sliding around the screen. Sure, it would've been more work to animate actual *people* moving, running, throwing—but I'll bet the After Dark gang could've done it.

Star Wars Screen Entertainment

Only LucasArts Entertainment has the guts not to call it a screen saver. They accurately call it "screen entertainment" ($34.95, 415/721-3300).

And on that score, this collection of 14 displays based on the *Star Wars* movies succeeds terrifically. George Lucas junkies will spill adrenaline to see the entire screenplay and storyboards for *Star Wars*. In one module, you read the life histories of every character ("As a young Wookiee on Kashyyyk, Chewbacca excelled at mechanical skill . . ."). In another, the familiar, yellow, perspective-slanted opening credits roll up your screen—but they say what *you* want them to say. ("I'm in a long, long meeting, far, far away . . .")

The synthesizer that plays the theme music sounds cheesier than a whole pan of

continues

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lasagna. Otherwise, though, this force is definitely with you.

The Shareware 400

On America Online alone, there are over 400 free or shareware screen savers. The most worthy: DarkSide of the Mac 4.2, a polished application with *45* modules ($15 requested; Tom Dowdy, 1610 Kamsack Dr., Sunnyvale, CA 94087). The modules aren't After Dark 3.0 caliber, but they're not bad. Ambrosia Software's Eclipse 2.2.0 just bounces around a clock or a graphic of your choice, but it takes up only 5K of memory and doesn't interfere with modem or printer activity ($10, 716/427-5277).

After Dark 3.0 (and friends)

After soaking in all the upstarts and rivals, I came back to After Dark last. It was worth the wait.

After years of screen-saver natural selection, After Dark 3.0's modules are the cream of the cream of the cream: the funniest, most stunning and well-crafted displays you can imagine ($49.99, Berkeley Systems, 510/540-5535). The Flying Toasters now do aerial stunts. The tropical fish have become photo-realistic, and you can actually see the room light flicker on the tank's bottom. In Bugs, the animation of the life-size flies is so realistic you'll grab for a rolled-up magazine. And as always, the MultiModule feature lets you superimpose or combine different displays in twisted ways.

Jewels of the Screen The rotating diamonds of After Dark's Ray module will take your breath away—but they won't save your screen.

The spin-off module sets—Star Trek, Simpsons, Disney, X-Men—don't have nearly the same consistency of perfection ($49.99 each). Both the number of modules and their wit quotient seems to decline with each new release; only half of the Simpsons displays even attempt to be funny, for example, and the X-Men are a big Y-awn.

But After Dark itself—and, to a slightly lesser extent, the More After Dark collection ($39.99)—is purest joy. Berkeley Systems could actually afford to give up its burn-in scare tactics and sell these things on brilliance alone.

The Upshot

More screen-saver cautions: Make way—some of these puppies take up 10 hard-disk megs or more. You may pay a price in system conflicts, too. Screen savers must be updated with every round of new Mac models or system software. After Dark 2.0, for example, was updated 11 times during its life cycle. And beware on Power Macs, where screen savers may slow down the works (although spokespeople swear that After Dark and the Delrina programs don't).

Want the best screen saver there is? Switch off your monitor when you are not using it—yes, even while the Mac is still on. You'll rule out burn-in *and* you'll save money.

But if it's visual delights you're looking for, get Far Side for laughs, After Dark for rapture, or Bliss for bliss. After a few months of staring at those programs, your only burn-in concern will be with your retinas. ■

DAVID POGUE is the author of *More Macs for Dummies*, sequel to his number one best-seller, *Macs for Dummies*, third edition (IDG Books Worldwide, 1994). He eagerly awaits the release of After Dark: The Oprah Winfrey Collection.

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THE ICONOCLAST

BY STEVEN LEVY

Sign Here

Caught in the cross fire of digital signatures

USERS WHO HAVE UPGRADED to System 7.5 have probably encountered DigiSign, a function of PowerTalk that enables a user to "sign" an electronic message or document with a mark that identifies it as an artifact generated by that individual alone. Perhaps you have wondered whether you should take the plunge with DigiSign.

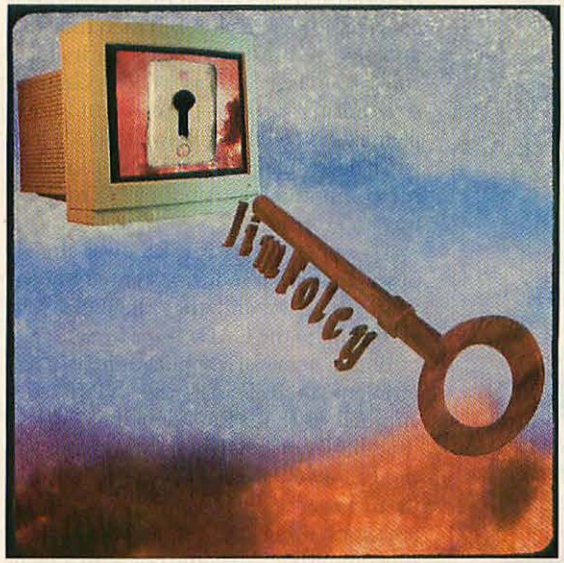
More on that in a moment. For now, let's consider the prodigious benefits of digital signatures. One problem with electronic mail is the relative ease with which messages can be forged, or "spoofed." Consider the (actual) case at Dartmouth University: members of a class received an E-mail note stating that the professor had canceled the midterm exam—a note posted by a hoaxer, not the professor.

With a digital-signature system, such deception would never have happened—skeptical students could verify the message. Also, digital signatures can ensure that a message hasn't been tampered with. No one can electronically insert a negative into one of your sentences, twisting it into the opposite of what you wanted to say.

Perhaps most important, digital signatures make possible all sorts of commercial transactions and contracts over computer networks, with full security. A digital signature transfers the kind of assurance that you have in the physical world—I know it's you because I see you—into cyberspace.

This confidence is possible because in 1976 Diffie Whitfield and Hellman Martin, two scientists associated with Stanford University, announced a new way to do cryptography, the means of ensuring the privacy of messages. They called it public-key cryptography. Unlike previous systems that used a single cryptographic key to scramble and unscramble the messages, this relied on a double key, a pair of special numbers. One part of the pair, an individual's key, is distributed publicly (ergo, the name of the system), while the other key is shared with no one else.

This system not only allows you to communicate with people so that eavesdroppers can never hear, but unlike previous systems, public-key cryptography also lets you send private messages to people with whom you have made no previous arrangements for secret communication. For instance, let's say that I want to send a private message to Apple head Michael Spindler; I scramble the message using his public key (which he has presumably circulated). Once I do that, only one person can unscramble the gibberish I have created: the person holding the other, private half of the key—Michael Spindler. If Spindler wants to send a secret message back to me, he uses my public key to encipher the note, and I use my private key to switch the gibberish back to his original text.



But that virtue is only part of the public-key system. The other component comes when I use my private key as my digital signature, to scramble something. My goal is not secrecy—anyone who has my public key can decipher what I've encoded—but *authentication*. When someone uses my public key to clarify a string of nonsense code into a coherent piece of information, he or she then knows that the message came from the only person in the world who holds the other half of the key—me. By using my private key on the document, I am, in essence, "signing" it.

Considering the pervasiveness of computer networks, the driving desire to conduct business over them, and the pathetic vulnerability of our current system in ensuring the authenticity of E-mail, digital signatures are not a high-tech luxury but an immediate necessity. The private sector has responded: RSA Data Security, holder of patents from the founders of public key, as well as the MIT patent of a subsequent implementation of the system, has widely licensed RSA's technology; and Apple, Microsoft, and Lotus are among the software companies settling on public key as an easy solution, a sound standard. The idea is to make signing digital documents as easy as, well, selecting from a menu.

Sounds simple. But digital signatures have become a battleground in the larger war over government cryptographic policy. And you—along with all the other poor schmoes who simply want to take advantage of one of the more exciting features of System 7.5—are caught in the cross fire.

NSA Blues

"The government has a particular interest," explains Steve Crocker, vice president of Trusted Information Systems, a security company. "They want to retard the use of cryptography, which restricts their ability to read your mail." So in recent years, as cryptography has begun to filter into general use, the National Security Agency (NSA) has begun to get involved in the software business—creating less-threatening cryptosystems for the general public.

In this case, the NSA invented its own scheme, the Digital Signature Standard (DSS). Its most important feature is what it doesn't do. The system does not take advantage of the versatility of public-key cryptosystems; for example, you can't use

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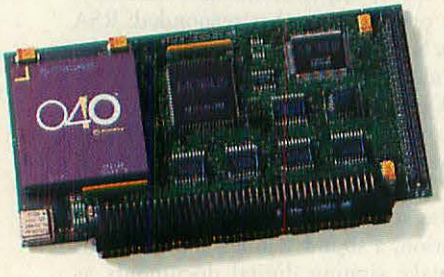

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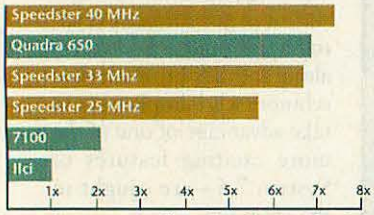

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the DSS to make your messages secret, only to sign them. That's not the only problem. Tests show that the DSS is much less efficient in verifying signatures. There are also patent problems: though the government disagrees, RSA Data Security claims that the DSS infringes RSA patents, and the company threatens to sue anyone who uses it. Even worse, the system is a very late arrival—only now are test programs being set up to use it, while millions of people already use the RSA algorithm. And perhaps worst of all, the DSS—a standard proposed by our biggest spy agency—has little chance of being accepted as a worldwide standard. To the degree that we accept it, we may become marginalized in international commerce.

It is this system, and no other, that has won government approval.

The choice was made not by the NSA but by the agency theoretically in charge of such decisions, the National Institute of Standards and Technology (NIST). At first, however, it appeared that the NIST was leaning toward endorsing RSA's algorithm; a 1989 investigation indicated that the RSA system was "widely known and widely used . . . a most versatile public-key cryptosystem." The fact that RSA's system could handle signatures (for authentication) and encryption (for privacy) was considered a huge plus. But then the NSA got involved in the process, in its legal role as adviser, and as a 1993 General Accounting Office (GAO) study explained, "NIST has followed NSA's lead when developing cryptographic standards for communications policy." The DSS was no exception.

Despite the fact that RSA was already in wide use, that industry wanted to continue using it, and that the DSS was, according to the GAO, "for a broad range of digital signature applications . . . less efficient than RSA," the NIST succumbed to the NSA's demands. While the NIST's original intent was to provide the best standard for digital signatures, its goal eventually became, as one unusually frank official said to a congressional subcommittee, "to come out with a technology that did signatures and nothing else very well . . . a technology that would provide the federal agencies with a public-key–based signature technique but would not do damage or injury to other interests in the government."

Others, both in government and out, have concluded that the driving force for the NSA's DSS was the agency's desire to match that algorithm with the key-escrow encryption in the Clipper chip—the encryption system that requires users to allow government access to their secret keys. Marc Rotenberg, head of the Electronic Privacy Information Center, characterizes the DSS as "the stepbrother of the Clipper chip."

But unlike the Clipper—which was always proposed as a system that traded off a measure of privacy to provide for wiretapping and national-security surveillance—the implementation of the DSS has been relatively covert, and unaccompanied by a clear or meaningful explanation from proponents of why it is needed for law enforcement.

Until we are so enlightened, I think you can, in very good conscience, send back the Signer Request Form that comes with System 7.5; get it notarized and pack it off to RSA Data Security to get your own key and begin using DigiSign. If enough people use that signature algorithm, it will be utterly impractical for government agencies to ignore a de facto worldwide standard. But I should warn you of the implications. By using the kind of digital signatures employed by Apple, you are endorsing a standard that is deemed inappropriate for government use—a standard that our government would like to replace with its own less efficient and less versatile system. Oddly, by taking advantage of DigiSign, you are making a sort of political statement, exercising a virtual vote on where you stand on the conflict between personal rights and governmental control. Just by performing the electronic equivalent of signing your name.

You'll know that the battle is won when agencies like the IRS announce that they are going to accept not only DSS signatures but RSA ones as well. Once the DSS loses its sole government endorsement, its raison d'être will be gone.

Benefits to All

By freeing all sorts of transactions from the constraints of the physical world, digital signatures will benefit all of us—not least of which is the government. "I expect this to be one of the enabling technologies that will revolutionize the federal government and be one of the more powerful forces in the reinvention of government," says Lynn McNulty, a NIST official. And although your voice had no impact on the government's process of choosing its standard, you can have your say simply by using what comes in the System 7.5 box.

Let the signing begin! **m**

STEVEN LEVY's latest book is *Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything* (Viking, 1994). Levy is a fellow of the Freedom Forum Media Studies Center in New York.

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Saints and Sinners

The fourth annual roundup of wise and wicked companies

ONCE AGAIN, *MACWORLD* SURveys the Macintosh marketplace, digging for details on wise companies that offer good consumer policies, and wicked corporations that fall short. Have your favorite companies been saints or sinners this year—or possibly a little bit of both? To find out, read on (company listings are in alphabetical order).

Last spring Adobe released Illustrator 5.5 with a flaw affecting version 5.0 documents that use the horizontal-scale function with full justification turned on. Opening such documents in Illustrator 5.5 creates holes in text and causes rewrapping problems. The good news is that Adobe plans to release version 5.5.1 in January for a nominal fee. In addition to fixing the problem, this upgrade will mean faster performance for both the 680X0 and Power Macintosh versions.

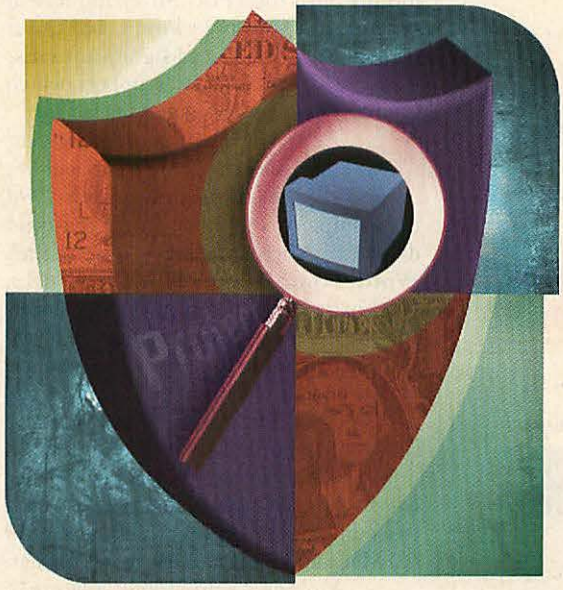
Apple's recent TV ad campaign claimed that Power Macs run all your DOS and Windows software. Fact is, you can't run recent copies of many Windows applications because Insignia Solutions' SoftWindows does not support 386 enhanced mode. Other Apple sins include hellish hold times (20 minutes or more) for folks who call Apple's technical support; an announced but still largely nonexistent computer trade-in program; and customer-service reps who refuse to cover PowerBook doors broken while under warranty—even though official Apple policy is to cover doors damaged through normal wear and tear.

Then there are the requirements for Apple Personal Diagnostics software, which seem quite simple: a Mac Plus or later or a PowerBook, System 6.0.7 or later, and a hard drive. But buyers of version 1.0 discovered that owners of 11 different Mac models needed to pay $10 for an emergency start-up disk not included in the package. (Apple says it waived the $10 fee early on and that version 1.1, now shipping, includes all the disks.)

Finally, let's not forget Apple's failure to ship a Power Mac upgrade board for entry-level Macs until last November. That's after announcing upgrade plans for its low-end machines last February.

Still, Apple has a saintly side. For the first time, it has authorized its dealers to sell Macs by mail. Also, in the past year it donated computer technology worth $1.2 million to 11 schools, announced remanufactured toner cartridges for its laser printers, and offered a short-term rebate for recycling toner cartridges.

Storage-device manufacturer APS became a saint in 1994 by introducing a no-hassle return policy. Customers no longer need to call for return merchandise approval (RMA)—as they must for most mail-order companies—as long as they return the merchandise within 30 days.



Font maker Bitstream sinned in 1994 by offering PC users a $49.95 CD-ROM with 500 fonts—but no similar deal for Macintosh fans, who must still buy Bitstream fonts individually.

Claris Corporation sinned by announcing a program last March that never saw the light of day. Claris killed the utility—originally called Safety Suite, then renamed On Patrol—two months before it was slated to ship. Mail-order companies were already advertising it.

Still, Claris was kind to Resolve owners. When the spreadsheet was discontinued, users were able to buy ClarisWorks 2.1 for only $29.

A company called Clarus Systems Group shows a devilish bent by advertising "field conditioning" technology that supposedly neutralizes the negative effects of electromagnetic fields (EMF) produced by computers and other electric devices. How? By "reducing the physical stress and 'zapped out' effects of EMF." Thanks to this fabulous technology, claims the company's literature, "brainwave activity increases, learning disabilities are diminished, and computer memory errors are actually reduced." One expert describes Clarus's claim in two words: "snake oil."

CompUSA deserves horns for continuing to use old and incorrect literature claiming that the Apple Performa 475 has a 68040 processor. It may not be a big deal to CompUSA or any other retailers disseminating this misinformation, but Performas use a 68LC040 processor, not the standard 040 chip that includes a math coprocessor. That missing coprocessor *is* a big deal to anyone who does serious number crunching.

Sanjiv Misra, owner of DataLink Resources of Austin, Texas, sinned this year by providing poor customer service, according to *Macworld* readers. Ole Petter Haukaas of Norway says Misra shipped him a defective monitor in October. The same broken monitor had been shipped first to a customer in Pennsylvania, then to another in California. Haukaas says that when he opened the shipping carton, he found letters to Misra about the monitor from both customers. All three say DataLink owes them

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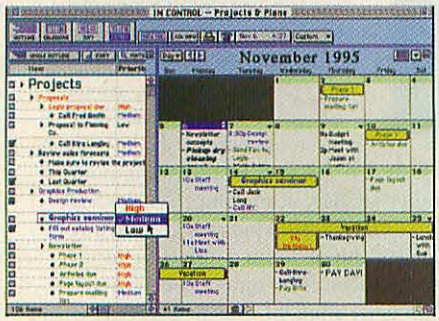

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big bucks for products they never received or that were defective.

Although Misra had contacted *Macworld* in September to say that two of his customers had received long-awaited refunds (see *Conspicuous Consumer*, December 1993), these three customers still haven't gotten refunds and DataLink's telephone number has been disconnected.

DayStar Digital is a saint for offering a universal upgrade program in which the company buys back any DayStar product, including discontinued boards, from registered customers who are upgrading their machines.

But alas, the company has on occasion advertised its products some time before they ship. DayStar sinned in August by announcing entry-level PowerPC 601 upgrades that didn't exist until November. (DayStar also builds these boards for Apple.)

Global Village Communication has been a mixed blessing for consumers this past year. A few users are disgruntled that the company has reorganized its technical support on America Online and eWorld and no longer offers direct public responses to inquiries. Still, one reader praises the company for replacing a 21-month-old PowerPort Silver modem at no cost and within 24 hours, and other readers have also voiced significant satisfaction with the company's support, which Global Village says is being beefed up.

Microsoft sinned last year making promises it couldn't keep. In mid-March 1994 the company announced that it would deliver its Microsoft Office suite (Excel, Word, PowerPoint, and Mail), Works, and FoxPro for the Power Macintosh this summer. Power Mac versions of Excel and FoxPro began shipping in September. Word and PowerPoint followed in the first week of November; Works was also slated for sometime in November but was not yet shipping at press time. On the bright side, Microsoft is distributing a free converter utility that translates Word 6.0 Mac and Windows files to 5.1 format.

Mobius Technologies advertises blazing performance for its 040 accelerator that Macworld Lab has been unable to verify (see "Making the Move to Power Mac," in this issue). Our tests show that the improvement is significant but that the product is not nearly "as agile as advertised," as one reader points out.

Quark has a dismal reputation for customer service, which I've written about in the past (see *Conspicuous Consumer*, February 1994). But Quark surely deserves a halo for its online support on America Online, which is just terrific.

Radius's lifetime warranty and overnight replacement of its add-on boards is something to celebrate. And Radius shipped VideoVision Studio 2.0 upgrades with packaging so its customers could return the original boards after the upgrades had arrived. Alas, the company did sin by claiming 2.0 would be available by July; it arrived in September.

Shreve Systems advertises a 15 percent fee on returns, but its invoices say the restocking fee is 20 percent—and that's what at least two readers were charged when they returned purchases. Company president Richard Harold says customers should not be charged 20 percent if they return the merchandise within 30 days.

SoftKey's KeyFonts and FontBank's Display Typefaces are TrueType bargains—unless you need a foreign character such as ñ, or you want to use ligatures or certain symbols (the ° sign, for example). Unfortunately, the two companies' advertising and product packaging do not warn buyers of these and other limitations. Still, SoftKey also deserves a halo for sending free software to customers as an apology for the poor customer service some of them experienced when the company merged with two other companies.

Earlier this year Symantec Corporation riled Central Point Software customers by acquiring the company and then eliminating Central Point's free technical support. Then in August, Symantec showed a devilish bent for mischief by releasing a flawed Norton Utilities 3.0 for Macintosh. In rare situations, using version 3.0's Speed Disk module can result in data loss.

That's the bad news. The good news is that the company notified users of the problem in early September and shipped them a fix within ten days, thus earning a halo for its prompt response to an ugly situation.

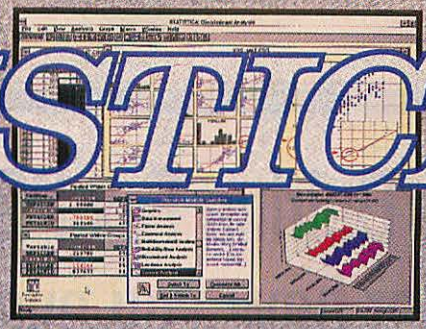
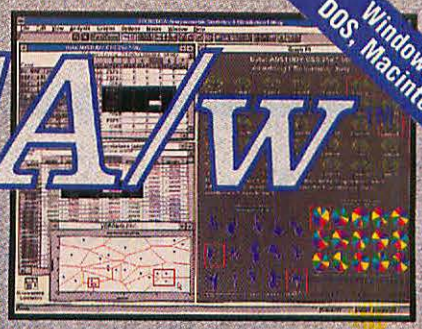
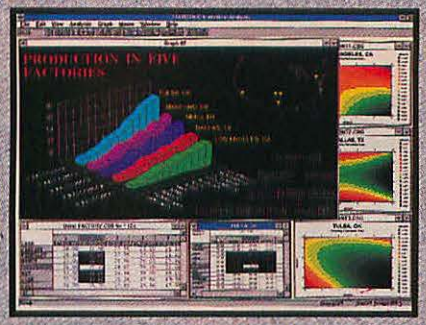
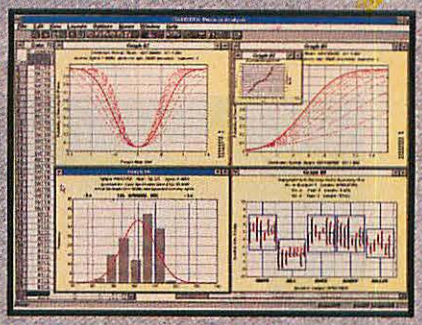
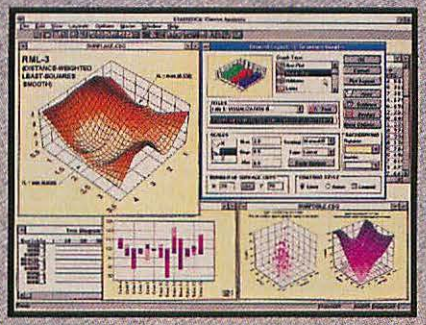
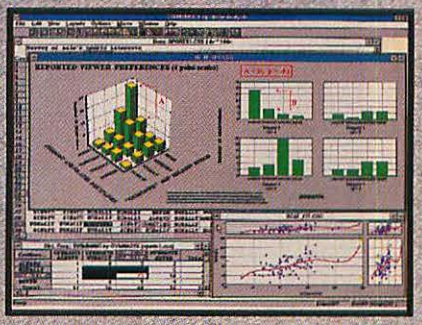
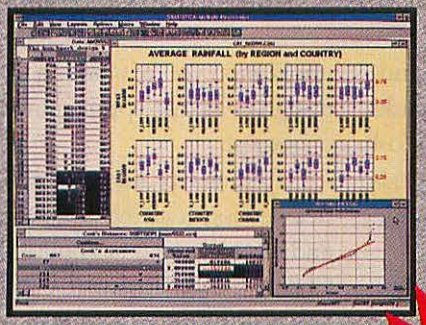
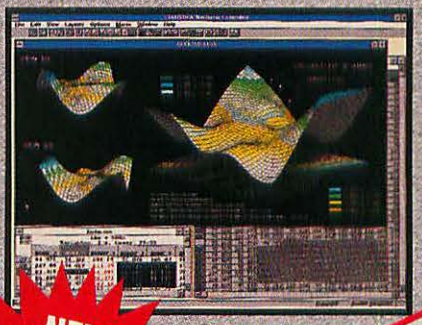
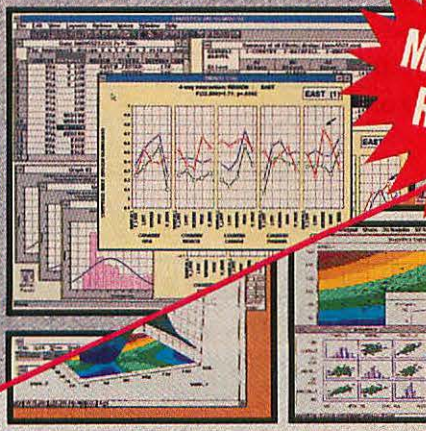
Missing in Action

Nobody's perfect, but corporate actions do count. Let me know if I missed a saint or sinner—there's always next year's list! **m**

Send nominees for sainthood to *Service Heroes, Macworld*, 501 Second St., San Francisco, CA 94107, or via the Internet (branscum@aol.com). Also, drop *Conspicuous Consumer* a line if a company is ignoring you.

STATISTICA/w™

Windows, DOS, Macintosh

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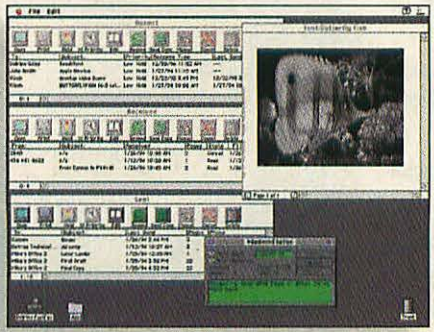

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Editors' Choice

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Elizabeth Maffly

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their type in *Macworld*'s comparative articles. A ❖ next to a product indicates that we chose more than one product in that category. A ◀ next to a product listing indicates that a native Power Mac version is available.

Hardware

MONITORS

SMALL COLOR MONITORS, Jan 94

14-inch display: ❖ Sony CPD 1430; Sony Corp. of America, 800/222-7669; $779.95.
❖ Nanao FlexScan F340i•W; Nanao USA, 800/800-5202; $799.

15-inch display: NEC MultiSync 4FGe; NEC Technologies, 708/860-9500; estimated street price $755.

TWO-PAGE COLOR MONITORS, Nov 94

PressView 21 Display System; SuperMac Technology, 408/541-6100; $3999.

NETWORK HARDWARE

REMOTE-ACCESS SERVERS, Oct 94

Mixed networks: NetConnect Remote Access Server; Asanté Technologies, 408/435-8401; $3899 for eight ports.

AppleTalk networks: ARA Multiport Server; Apple Computer, 408/996-1010; four ports $1799, eight ports $3298.

PRESENTATION HARDWARE

PORTABLE PRESENTERS, Jan 95

Z115; nView, 804/873-1354; $5495.

PRINTERS

COLOR PRINTERS, Aug 94

Low-end ink-jet: DeskWriter 560C; Hewlett-Packard, 800/752-0900; $719.

Solid ink-jet: Phaser 300i; Tektronix, 503/682-7377; $9995.

Thermal-wax transfer and color laser: Phaser 220i; Tektronix, 503/682-7377; $5995.

DYE-SUBLIMATION PRINTERS, Jul 94

Prepress proofing—tabloid size/fastest: Phaser 480; Tektronix, 503/682-7377; $14,995.

Prepress proofing—tabloid size/most complete: Rainbow; 3M, 612/733-1110; estimated street price of $20,000.

Prepress proofing—letter size: ProofPositive Full Page; SuperMac Technology, 408/541-6100; $7999.

General publishing and business: Phaser IISDX; Tektronix, 503/682-7377; $9995.

PERSONAL PRINTERS, Sep 94

Ink-Jet: DeskWriter 520; Hewlett-Packard, 800/752-0900; $365.

Laser—$1000 to $1600: microLaser Pro 600; Texas Instruments, 214/995-6611; $1599.

WORKGROUP PRINTERS, Feb 94

High-speed: Hewlett-Packard 4Si MX; Hewlett-Packard, 800/752-0900; $5499.

Best buy: ❖ Apple LaserWriter Pro 630; Apple Computer, 408/996-1010; $2529. ❖ Hewlett-Packard LaserJet 4M; Hewlett-Packard, 800/752-0900; $2329.

SCANNERS/IMAGE CAPTURE

ELECTRONIC CAMERAS, Sep 94

Apple QuickTake 100; Apple Computer, 408/996-1010; $749. ◀

LOW-COST COLOR SCANNERS, Nov 93

$1300 to $1600: ❖ La Cie Silverscanner II; La Cie, 503/520-9000; $1599.
❖ Hewlett-Packard ScanJet IIc; Hewlett-Packard, 800/752-0900; $1599.

Under $1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; $1299.

OCR, Nov 93

OmniPage Professional; Caere Corp., 408/395-7000; $995. ◀

SYSTEMS/STORAGE

1.3GB OPTICAL STORAGE, Dec 94

Best low-cost solution: 1.3Gig MO; Club Mac, 714/768-8130; $2099.

Best overall performance: Genesis 1300; Microtech, 203/468-6223; $2899.

DOUBLE-SPEED CD-ROM DRIVES, Jul 93

Sheer speed: Pioneer DRM-604X; Pioneer, 800/444-6784; $1495.

Overall value: AppleCD 300; Apple Computer, 408/996-1010; $599.

Budget choice: NEC MultiSpin 38; NEC Technologies, 708/860-9500; $465.

HIGH-SPEED HARD DRIVES, Aug 93

2.7GB drives: ❖ Nova XL 2700; Microtech International, 203/468-6223; $2999. ❖ Vista 3.5GB; Relax Technology, 510/471-6112; $3499.

SCSI-2 adapter: QuickSCSI; PLI, 800/288-8754; $499.

MACINTOSH UPGRADES, Jun 93

SE accelerator (25MHz): Quik30; Novy Systems, 904/427-2358; $449 (without FPU).

SE/30 accelerator (50MHz or 33MHz): Universal PowerCache; DayStar Digital, 404/967-2077; 50MHz $999 (with FPU), 33MHz $449 (without FPU).

LC and LC II upgrades: Macintosh LC III Logic Board Upgrade; Apple Computer, 408/996-1010; $599.

Mac II accelerators: ❖ Radius Rocket 25i, Radius Rocket 33; Radius, 408/434-1010; 25i $1199, 33 $2499.
❖ Universal PowerCache series; DayStar Digital, 404/967-2077; $449 to $999.

IIfx SCSI accelerator: QuickSCSI; PLI, 800/288-8754; $499.

Quadra static-RAM cache card: FastCache Quadra; DayStar Digital, 404/967-2077; $299 for Quadra 700 and 900, $449 for Quadra 800 and 950.

PC COPROCESSING, Oct 94

OrangePC Model 210; Orange Micro, 714/779-2772; $1283.

SYSTEM UPGRADES, Feb 95

Upgrade for Macintosh Quadra 650, 800, or 950: Power Macintosh Upgrade Card; Apple Computer, 408/996-1010; $699.

Upgrade for other 680X0 Macs: Replace with Power Macintosh 6100/60 with CPU booster and cache card. Power Macintosh 6100/60; Apple Computer, 408/996-1010; $1819 (base system with 8MB of RAM). PowerClip (CPU booster); Newer Technology, 316/685-4904; $245. 256K cache card; various companies, roughly $200.

VIDEO/DISPLAY

24-BIT VIDEO CARDS, Apr 94

Inexpensive acceleration: PrecisionColorPro 24XP; Radius, 408/434-1010; $599.

Full-featured acceleration: Thunder II GX•1360; SuperMac Technology, 408/541-6100; $4499.

HIGH-END VIDEO EDITING, Jun 94

Presentation video: ❖ MoviePak2 Pro Suite; RasterOps, 801/785-5750; $4199. ❖ VideoVision Studio; Radius, 408/434-1010; $4499.

Corporate video (offline): Media Composer 400s; Avid Technology, 508/640-6789; $14,995.

continues

MACWORLD Editors' Choice

Corporate video (online): VideoCube; ImMix, 916/272-9800; $40,500.

PHOTOSHOP ACCELERATORS, Apr 94
PhotoBooster; Radius, 408/434-1010; $999.

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: M.Y.O.B.; Best Ware, 201/586-2200; $199.
Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; $119.95.

BUSINESS TOOLS

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $595.
Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; $895.

CD-ROM

TOP 10 CD-ROMS, Mar 94
Overall: Seven Days in August; Time Warner Interactive Group, 818/955-9999; $79.99.

COMMUNICATIONS/NETWORKS

COMMUNICATIONS SOFTWARE, Aug 94
Basic connectivity: ZTerm; David P. Alverson (no phone number available); $30.
Terminal emulation: Crosstalk for Macintosh; Digital Communications Associates, 404/442-4000; $195.
Internet exploration: VersaTerm; Synergy Software, 215/779-0522; $125.

DOS WINDOWS EMULATION, Oct 94
Timbuktu Pro 1.0.3 for Macintosh, Timbuktu 1.1 for Windows; Farallon Computing, 510/814-5000; $199 each.

HIGH-SPEED FAX MODEM SOFTWARE, Oct 93
Faxstf; Telefocus, 816/886-9800; $79.

NETWARE CONNECTIVITY, Sep 93
NetWare for Macintosh; Novell, 801/429-7000; $495 for 5-user license to $2295 for 200-user license.

PROTOCOL ANALYZERS, Jul 94
EtherPeek, AG Group, 510/937-7900; $795.

TERMINAL EMULATOR, Oct 93
VersaTerm; Synergy Software, 215/779-0522; $149.

GRAPHICS

3-D MODELING, Dec 94
Stand-alone modeler: Form Z; autodessys, 614/488-9777; $1495.
Integrated-modeling package: Strata StudioPro; Strata, 801/628-5218; $1495.
Entry-level modeler: Infini-D; Specular International, 413/253-3100; $695.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ❖ ClickArt Studio Series; T/Maker Company, 415/962-0195; $99.95 per volume.
❖ Electronic Clipper subscription service; Dynamic Graphics, 800/255-8800; $67.50 per month.
❖ Metro ImageBase Electronic Clip Art; Metro ImageBase, 800/525-1552; $74.95 per volume, CD-ROM $149.95.
❖ Images with Impact series; 3G Graphics, 800/456-0234; $99.95 to $129.95 per volume, CD-ROM $499.
❖ Typographers' Ornaments; Underground Grammarian, 609/589-6477; $25 per volume; ten TIFF albums $200; EPS volumes $50 each.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/567-9990; $49.95.
Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; $79.
Beginners' program: Aldus SuperPaint; Aldus Consumer Division, 619/558-6000; $149.95.
Overall: Canvas; Deneba Software, 305/596-5644; $399.

FONT BUYERS' GUIDE, Mar 94
Text-face collection: Type On Call CD-ROM; Adobe Systems, 415/961-4400; $99 (this price includes the ability to unlock two families from preselected packages); an additional $25 enables you to unlock individual faces, or $69 to $179 for unlocking families.
Display/decorative-face collection: Fontek; Letraset, 201/845-6100; $39.95 per face.
Bargain collection: Monotype ValuePack; Monotype, 312/855-1440; $89 for 57 fonts.

IMAGE DATABASES, Oct 93
❖ Aldus Fetch 1.0; Adobe Systems, 206/628-5739; $295.
❖ Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; $249.

IMAGE EDITORS, Feb 95
Adobe Photoshop 3.0; Adobe Systems, 415/961-4400; $895.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94
ClarisWorks; Claris Corporation, 408/727-8227; $299.

Vendors: Please write to *Macworld Editors' Choice*, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price.

ONLINE SERVICES

ONLINE SERVICES, Aug 94
E-mail: America Online; America Online, 703/893-6288; basic monthly fee $9.95.
Reference: CompuServe; CompuServe Information Service, 614/457-0802; basic monthly fee $8.95.

ORGANIZATION/PRODUCTIVITY

CALENDARS, Jul 93
Alarm system: ❖ First Things First; Visionary Software, 503/246-6200; $79.95. ❖ Smart Alarms Plus; JAM Software, 203/630-0055; $75.
All-around scheduler: Now Up-to-Date; Now Software, 503/274-2800; $99.
Meeting scheduler: Meeting Maker; On Technology, 617/374-1400; five-pack $495.

GRAPHING SOFTWARE, Aug 94
DeltaGraph Pro 3 3.0.4; DeltaPoint, 408/648-4000; $195.

SALES-AUTOMATION SOFTWARE, Oct 93
❖ Contact Ease; WestWare, 619/274-5053; one user $395, five users $1495. ❖ CBS; Colleague Business Software, 512/345-9964; $495.

TEXT-RETRIEVAL SOFTWARE, Dec 93
Small system: On Location; On Technology, 617/374-1400; $129.
Multiuser system: Personal Librarian; Personal Library Software, 301/990-1155; $995.

PRESENTATION TOOLS

PRESENTATION SOFTWARE, Jul 94
Persuasion 3.0; Adobe Systems, 206/622-5500; $495.

UTILITIES

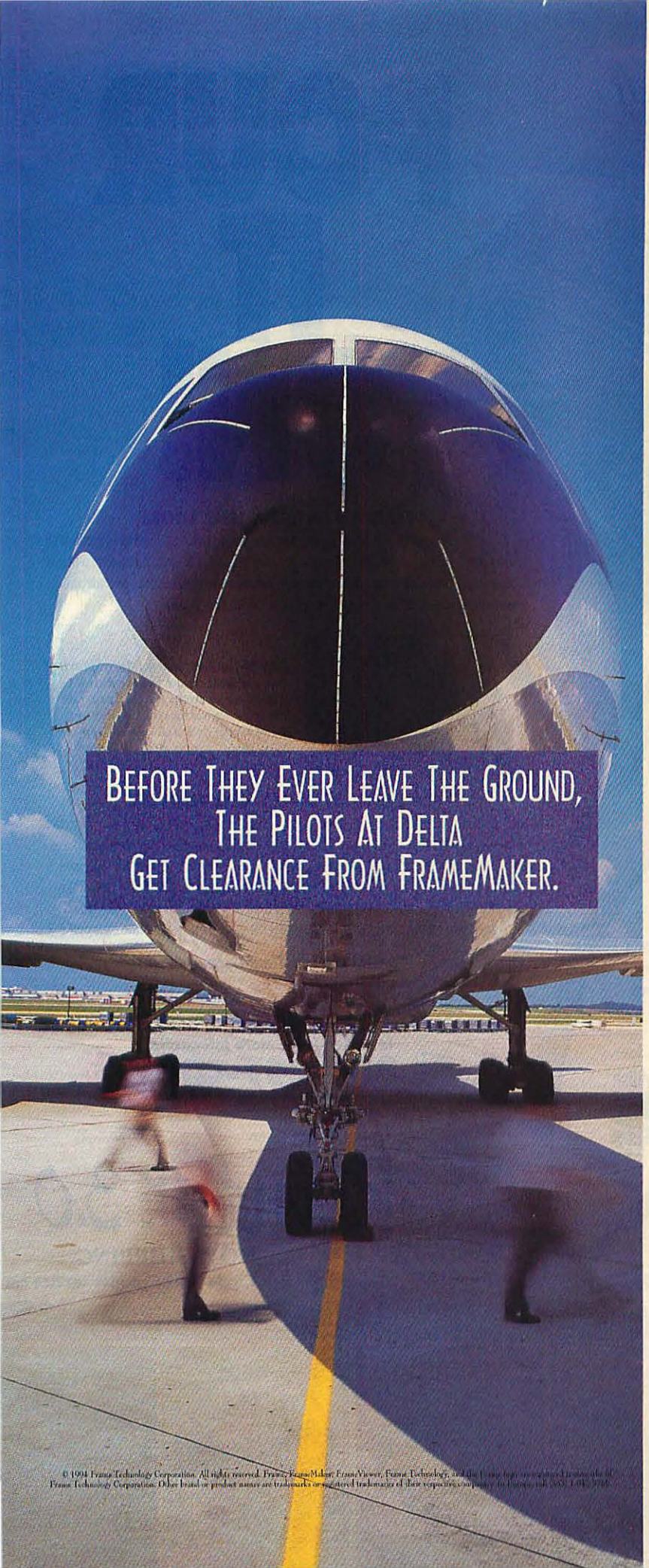
BRAVE NEW DOCUMENTS, Jan 94
Application-independent document distribution: Common Ground; No Hands Software, 800/598-3821; $189.95.
Book-length documents: FrameReader; Frame Technology, 800/843-7263; $84.95.

PRINTING, Sep 93
PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; $149.

VIRUS KILLERS, Jul 94
Commercial software: Virex; Datawatch, 919/549-0711; $99.95.
Free software: Disinfectant; free from online services.

VIRTUAL MEMORY SOFTWARE

VIRTUAL MEMORY, Jun 94
Virtual memory software: Virtual 3.0; Connectix Corp., 415/571-5100; $99.
Memory-boosting software: RAM Doubler 1.0.1; Connectix Corp., 415/571-5100; $99. m



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Star Ratings

HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

Edited by Wendy Sharp

Macworld Star Ratings lets you compare hardware and software products for the Macintosh by providing summaries of *Macworld*'s authoritative product reviews from the past year. The number of stars at the beginning of each capsule review indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones. The ◀ symbol indicates that a product is available in a native Power Mac version, although unless stated otherwise the version we reviewed was the 680X0 version.

If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

Software

BUSINESS TOOLS

★★★ **4D First 1.0 (1.0.1), ACI US, 408/252-4444, $295.** This entry-level relational database is a low-cost way to distribute the power of 4D and 4D Server to an office full of Macs. It's not much easier to use, however, than the full-fledged 4D. May 94 ◀

★★★ **AccuZip6 1.8.7, Software Publishers, 800/233-0555, $689.** Bulk-mail software has informative progress indicators, batch and individual processing, low rates, and flexible parsing during import, but the interface is incomprehensible. Sep 94

★★ **BaseMap 1.0.1, GeoPoint, 415/957-1560, $149.** For simple maps displaying simple data, this map-making tool may be useful. It's not for the cartographic sophisticate, however, as it offers very limited data-display abilities and only one projection. May 94

★★ **Bulk Mailer CASS 1.00d, Satori Software, 206/443-0765, $150.** Unattended operation is possible with this bulk-mail software, but batch processing is slow and the program has coding problems. Sep 94

★★★ **CA-Cricket Graph III 1.52, Computer Associates International, 516/342-5224, $129.** Graphing software's features are just right for charts in the physical and social sciences, but lack pizzazz. The program is easy to learn and use, and includes math features for data transformations and curve fitting. Dec 94

★★★★ **ClarisImpact 1.0 (1.0 v3), Claris Corp., 408/727-8227, $399.** Business graphing, project management, object-oriented drawing, word processing, and presentation functions merge in this business graphics software. The outstanding integration offers versatility that dedicated programs are pressed to match. Jun 94 ◀

★★★ **Cricket Graph III 1.5 (1.52), Computer Associates International, 516/342-6000, $129.** Basic and foolproof charting program produces cleaner charts than Excel with little effort, although its feature set is fairly modest. Apr 94

★★★★ **Crystal Ball 3.0, Decisioneering, 303/449-5177, $295.** Compact business-simulation software is fast enough for complex projects and can pay for itself in disaster-avoidance in a variety of business tasks. Oct 94

★★★★ **Decision Analysis 2.5, TreeAge, 800/254-1911, $379.** Decision-assistance software handles complex business cases by constructing tree diagrams of probabilities and payoffs. It offers a type of modeling that is realistic and easy to modify. Nov 94

★★★★ **DeltaGraph Pro 3 (3.5), DeltaPoint, 408/648-4000, $195.** At its new lower price, this charting program is the best feature-for-feature value in Macintosh charting. There's even a new Chart Advisor function that suggests the appropriate display for your data. Apr 94 ◀

★★★ **Extend+BPR 3.0, Imagine That, 408/365-0305, $990.** Business-modeling software includes superior templates for business-process reengineering, but some programming experience is helpful. Oct 94

★★★ **FastTrack Schedule 2.1, AEC Software, 703/450-1980, $279.** Simple project-management software is ideal for managers who need to put together a schedule quickly and easily, but if you require more power to manage conflicts, you'll need a more comprehensive program. Sep 94

★★★★ **Helix Express 2.0.1 (2.0.4), Helix Technologies, 708/465-0242, $589.** Icon-based relational-database software's improved performance makes it a serious competitor for all-Mac networks. Especially notable is its much faster speed; multiuser operation is downright snappy. Jul 94

★★★ **InfoDepot 2.0, Chena Software, 610/770-1210, $295.** All-in-one program for project planning includes tools for brainstorming and organizing ideas; scheduling project steps; and entering, calculating, and presenting data. It does a good job but has some flaws. Jan 95

★★★ **Map II 1.5, ThinkSpace, 519/858-5047, $395.** Well-structured program has most of the functions a simple geographical information system needs and is suitable for introductory instruction in GIS and for alert first-time users who just like maps. May 94

★★★★ **MarcoPolo 3.0, Mainstay, 805/484-9400, $895.** Full-featured document-management system is significantly improved. The addition of OCR—both the handling of unrecognized words and the ability to batch-process TIFF files with OCR—makes it very usable. Jan 95

★★★ **MicMac 2.0v1, Nirvana Research, 408/459-9663, $89.** The concept of Mac as dictation machine is undeniably attractive, and Nirvana Research has pulled it off well. It takes lots of hard drive space to save recordings, though. Nov 94

★★★★ **Microsoft Excel 5.0, Microsoft Corp., 206/882-8080, $339.** Although the feature set of this native Power Mac spreadsheet is stunningly rich, the resource requirements are jaw-dropping, including nearly 30MB of hard drive space plus, to run comfortably, 24MB of RAM. Still, it is relentlessly complete. Jan 95 ◀

★★★★ **Microsoft FoxPro for Macintosh 2.5 (2.6), Microsoft Corp., 206/882-8080, $495.** Dazzlingly fast and easy to use relational database has a greatly improved interface and cross-platform compatibility. For projects of 4 to 20 users that handle large amounts of data it offers excellent performance. Apr 94

★★★ **Microsoft Works 4.0, Microsoft Corp., 206/882-8080, $99.95.** Although this isn't the best integrated package around, it's a sensible, low-cost choice. It offers a respectable word processor, database, spreadsheet, calendar, and address book, as well as a slide-show module, and drawing and communications tools. Jan 95

★★★★ **Pablo 2.0.1 (2.03), Andyne Computing, 613/548-4355, $695.** This effective end-user data-reporting tools puts a considerable workload on the corporate information department, but it sidesteps the hassles of SQL data access and produces great reports with minimal effort. Jul 94

★★★ **Street Atlas USA 2.0, DeLorme Mapping, 207/865-1234, $169.** For the most part, this geographical information software delivers what it promises at a great price. Although inaccuracies in the data are troubling, DeLorme pledges to fix all reported errors in subsequent annual updates. Oct 94

★★★ **TeamFlow 3.1, CFM, 617/275-5258, $295.** Total Quality Management flowchart software is a valuable business tool. Its report printing and customizability are limited, however. Nov 94

★★★★ **TopDown 4.0 (4.1), Kaetron Software Corp., 713/298-1500, $345.** Flowcharting program's support for custom symbols and automatic drawing aids, along with its ability to let you easily create and navigate lower-level charts, make it a productive tool. Jul 94

★★★★ **ZipZapp 1.0, True Basic, 603/298-8517, $39.95.** You can use this data-reference utility to find an area code, the correct spelling of a city's name, and more. The interface is intuitive, and the cost, low. Oct 94

★★★ **ZP4 12.1 (14), Semaphore Corp., 408/688-9200, $125.** Inexpensive bulk-mail software supports batch and individual processing, but the progress indicators are uninformative, and unattended operation requires extra work. Sep 94

continues

Star Ratings

COMMUNICATIONS/NETWORKS

★★ **AccessPC 3.0, Insignia Solutions, 415/694-7600, $129.95.** Utility translates most word-processor and some database formats, but it doesn't translate graphics and some of its translations result in data loss. Apr 94

★ **BLAST Professional, BLAST, Inc., 919/542-3007, $139.** Our reviewer could not get this telecom software to work reliably and consistently during his tests, and found the minimalist and quirky interface frustrating. Jan 95

★★★ **Crosstalk for Macintosh 2.0 (2.0.1), Digital Communications Associates, 404/442-4095, $195.** Commendable communications product has a feature set that well matches its competition. Still, the script editing is complex and you must manually enter phone numbers each time you use it. Apr 94

★★★ **Delrina FaxPro for Macintosh 1.0 (1.5.1), Delrina Corp., 408/363-2345, $129.** Fast, efficient fax software has an excellent address-book but also has some interface quirks and minor bugs. Feb 94

★★★★ **DOS Mounter Plus 4.0, Dayna Communications, 801/269-7200, $100.** File-transfer and translation utility works with floppies, removable drives, and network volumes and supports wild cards in DOS extensions. Apr 94

★★ **The Internet Companion, The Voyager Company, 914/591-5500, $29.95.** Well-written, HyperCard-based electronic book offers much less information than others. While Internet access is available through the accompanying software, you get just a terminal-emulation screen. Dec 94

★★★★ **Internet Explorer Kit and Internet Starter Kit, Hayden Books, 317/581-3500, $29.95 each.** Well-written books and useful software combine to produce one of the best introductions to the Internet available for Mac users. Dec 94

★★★★ **Internet Membership Kit, Ventana Media, 919/942-0220, $69.95.** If you need access to the Internet, this book and software combination is a good package. The best part about it is its included preconfigured software. Dec 94

★★★★ **MacLink Plus/Translators Pro 7.5, DataViz, 203/268-0030, $149.** If your PC files are in archaic formats, you'll need this file-transfer and translation utility. It's a great option for most users, but it doesn't support removable drives or network volumes. Apr 94

★★★ **MicroPhone Pro 2.0, Software Ventures Corp., 510/644-3232, $295.** The new feature set of this communications package includes multiple sessions, faxing, TCP/IP networking, and more, but it's a mixed bag. Not all the features are well integrated, although some are innovations for which users will be grateful. Oct 94

★ **PowerShare Collaboration Servers, Apple Computer, 408/996-1010, $999.** Before this collaboration software will be ready for prime time, Apple needs to overhaul the complex Admin application, add serious diagnostic aids, provide comprehensive documentation, and offer knowledgeable technical support at a price less than that of the program itself. Aug 94

★★★ **QuickMail 3.0, CE Software, 515/221-1801, $199 to $3799.** If you're shopping for a first-time E-mail application, this product is a good choice for ease of use and setup. This upgrade provides new tools, including a spelling checker; but the most promising tool, rules-based messaging, lacks some important features. Jan 95

★★★★ **Silver Cloud 1.2 (1.2.1), AG Group, 510/937-7900, $495 to $1595.** If you are administrating a large network, this network-management software will make your life simpler. Feb 94

★★★ **SITcomm 1.0 (1.0.1), Aladdin Systems, 408/761-6200, $120.** Inexpensive telecommunications software is fairly easy to set up and use, and will do well for people who use just one or two online services. Still, it lacks true scripting and has limited protocol options. Apr 94

★★★ **Snap Mail 1.0.1, Casady & Greene, 408/484-9228, $200 to $1440.** Software will put you on the electronic-mail trail more easily and more cheaply than any competing product, if you can live with some minor (but surprising) shortcomings. Jun 94

★★ **SoftPC 3.1, Insignia Solutions, 415/694-7600, $499.** While the speed of this Windows PC emulator is greatly improved, buying an add-in PC card for your Mac is more efficient. Mar 94

★★ **SoftWindows 1.0, Insignia Solutions, 415/694-7600, $499.** You can run Windows software on a Power Mac with this emulation software, but although it's a viable solution, you pay the price in terms of performance, compatibility, and actual cost. Aug 94

★★★★ **Timbuktu Pro 1.0 (1.05), Farallon Computing, 510/814-5000, $199 to $1999.** Terminal emulation product is a must-have for in-house technical-support staff and for people who need direct connection to computer systems on a variety of networks. The major enhancements of this version are TCP/IP support for Macs and noticeably faster screen redraw. May 94

★★ **TrafficWatch II 2.0 (2.1), Neon Software, 510/283-9771, $495.** The price of this AppleTalk traffic monitor is closer to that of full-blown network analyzers that do much more, albeit with greater complexity. Without printing, alarms, triggers, or true multiprotocol support, this product misses the mark. Jun 94

★★★★ **White Knight 12.0, The FreeSoft Company, 412/846-2700, $139.** While this telecom software can be bewildering, it works impressively well. If you're willing to read the manual from cover to cover, the program may become your favorite telecom tool. Nov 94

DESKTOP PUBLISHING

★★ **CheckPost 1.3, Working Software, 408/423-5696, $249.95.** Interface aside, this imagesetter-simulation software is generally disappointing. It can't automatically scale pages, it prints on a single sheet, and its error reporting is limited. Nov 94

★★★ **ClickBook 1.1, BookMaker Corp., 415/354-8161, $69.95.** If you need to create inexpensive booklets quickly and without hassle, this print utility that helps you format documents in double-sided booklet form is an excellent tool. Nov 94

★★★★ **FontChameleon 1.0.1, Ares Software Corp., 415/578-9090, $295.** Font utility introduces a new font-creation technology; it builds serif and sans serif fonts from a master outline file. It offers high-quality renditions of popular fonts, plus the ability to customize fonts. Sep 94

★★★ **FontMixer 1.0, Monotype Typography, 312/855-1440, $79.** Although a tad expensive for a one-trick pony, this font utility is a straightforward, relatively painless way to mix characters from different fonts to create composite fonts. Oct 94

★★★★ **Fontographer 4.0.4 (4.1), Altsys Corp., 214/680-2060, $495.** No other font editor does more or works better than this one. For the price of a few font families, it can give you a universe of unique faces. Oct 94

★★ **FotoTune 1.1 (1.13), Agfa Division of Miles, 508/658-5600, $395.** Color-management software has a capable engine, but it's not a complete color management system. Invisible tech support and poor documentation were only part of the problem. Apr 94

★★★★ **FrameMaker 4.0 (4.04), Frame Technology Corp., 408/433-3311, $895.** For such projects as long, structured documents—books, instruction manuals, and textbooks—this desktop publishing program is one of the best tools available. It's fast, well mannered, and a real time-saver. Mar 94

★★★★ **LaserCheck 1.0, Systems of Merritt, 205/660-1240, $199.** Imagesetter-simulation software can save you hundreds of dollars, and many hours, on imagesetting jobs by letting you use a laser printer to proof your work. Nov 94

★★★★ **PageTools 1.0, Extensis Corp., 503/274-2020, $129.** Collection of ten PageMaker Additions is packed with utility. Many users will find the PageAlign, PagePrinter, and PageRulers Additions alone worth the price, and the others frosting on the cake. Dec 94

★★★★ **Print Shop Deluxe 1.0 (1.1), Brøderbund Software, 415/382-4400, $49.95.** Even the most ham-fingered can create professional-looking greeting cards, signs, banners, letterhead stationery and calendars with these desktop publishing templates and graphics. While it's not a substitute for a high-end program, it is easy to use and inexpensive. Apr 94

★★★ **ReadySetGo 6.0.2, Manhattan Graphics Corp., 914/725-2048, $395.** There's no strong reason not to use this destop publishing software if its tools meet your needs, but there's no compelling reason to choose it, either. Its low price is nice, but not enough. Oct 94

EDUCATION

★★★ **Creative Writer 1.0, Microsoft Corp., 206/882-8080, $64.95.** Graphics/page-layout/word-processor hybrid offers some terrific type effects, zany sounds, and bright graphics. While it doesn't teach kids to be better writers, it does encourage them to develop ideas and provides a fun vehicle to express those ideas creatively. Sep 94

★★★ **The Cruncher, Davidson & Associates, 310/793-0600, $59.95.** If you want to teach a child spreadsheet basics, this combination educational spreadsheet and business application will do the job. It's creative and easy to use but slow. Aug 94

★★★★ **Grolier Multimedia Encyclopedia, Grolier Electronic Publishing, 203/797-3530, $395.** CD-ROM encyclopedia has excellent search capabilities, weighs much less than a shelf of books, and is lots of fun. Its timeliness and some hierarchical snafus were slight problems. Jul 94

★★★ **MacGrade 1.5.5 (2.2.7), CalEd Software, 800/795-0641, $85 to $245.** Grade-book program has a straightforward, simple interface and clear documentation. Feb 94

★★★ **Small Blue Planet 1.2.1, Now What Software, 415/885-3432, $79.95.** Nicely integrated collection of beautiful Earth-from-space images on CD-ROM lacks many features of standard atlases and doesn't have a search function, but is endlessly fascinating. Jul 94

ENTERTAINMENT

★★★ **Aquazone 1.0, Inago, 416/487-4005, $79.95.** The fish in this aquarium-simulation are beautiful, but they're darned hard to keep alive. Only two varieties

continues

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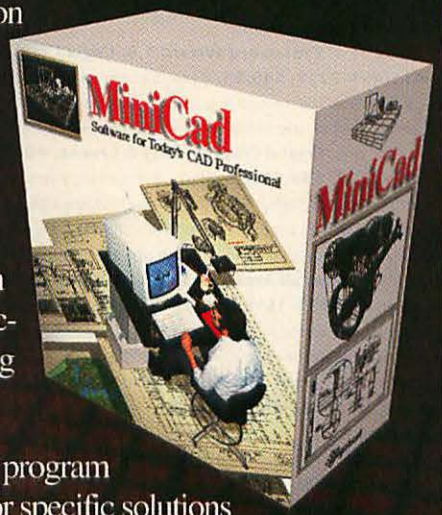

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Star Ratings

of fish are included. Jan 95

★★★★ **Crossword Wizard 1.0, Cogix Corp., 415/454-7217, $49.95.** If you're a crossword fan, this crossword-puzzle generator is a must. Although it's not perfect, the play mechanics are fantastic. Dec 94

★★★★ **Crystal Crazy, Casady & Greene, 408/484-9228, $49.95.** Ultraglossy, superpolished version of the classic Crystal Quest is challenging and fun without being overly difficult. Each level retains some old elements, and adds some new ones to keep you on your toes. Jun 94

★★★ **Firefall Arcade 1.0 (1.0.2), Inline Software, 617/935-1515, $49.95.** If you loved the classic video game Centipede, or are just looking for a fun shoot-'em-up, this arcade-style game will satisfy. Jun 94

★★★★ **Myst 1.0 (1.01), Brøderbund Software, 415/382-4400, $59.95.** The smooth pacing of actions and sounds in this beautiful CD-ROM game give it a dreamlike quality. This is a game that's been polished until it shines. Mar 94

★★★★ **SimCity 2000, Maxis Software, 510/254-9700, $54.95.** Your goal with this marvelous city-simulation is to build a city and run it successfully. The game is fascinatingly complex but simple to use. Jun 94

★★★★ **Spin Doctor (1.0), Callisto Corp., 508/655-0707, $59.95.** In the tradition of the best Macintosh games, this game tests your wits and reflexes alike. It's part strategy game, part kinetic sculpture. Jun 94

FINANCE/ACCOUNTING

★★★★ **Andrew Tobias' TaxCut 1993, MECA Software, 203/255-1441, $79.95.** The free-form approach and flexible Help menus of this tax-preparation software make filling out your tax return a smooth, almost relaxing process. The only state versions available are California and New York. Apr 94

★★★ **ExpensePlus 1.0.1 (1.0.2), State of the Art, 714/753-1222, $139.95.** Software uses a Newton MessagePad to record expenses, then sends the data to a Mac to create and print expense reports. While it's a real time-saver, you'll need AppleScript expertise to modify the expense reports. Apr 94

★★ **Financial Competence 1.5, Competence Software, 603/435-5098, $99.** Business economics tutorial explains how financial statements are compiled and how they relate to each other. Jul 94

★★★★ **MacInTax 1993, Intuit, 602/295-3110, $69.95.** Tax-preparation software provides a reasonably detailed manual and a reliable, structured interface for building your tax return. Its inability to accept figures containing amounts in cents or round off to whole dollar amounts will frustrate some users. Apr 94

★★★ **MacInTax Tax Planner, Intuit, 602/295-3110, $29.95.** Software allows you to construct a five-year forecast of your tax liability, projecting tax figures through 1997 in a concise summary format. If you have a tax preparation program, you can do the same thing by creating alternative tax returns. Apr 94

★★★ **MacInTax Tax Savings Guide, Intuit, 602/295-3110, $19.95.** Simple, straightforward collection of tax tips and suggestions is designed to help you better understand your tax return and reduce your tax liability. Although strong in content, it doesn't allow you to copy and paste, export as a text file, or even print. Apr 94

★★★ **MacMoney 4.01, Survivor Software, 310/410-9527, $89.95.** Personal-finance software has new and improved features that will please longtime users, but it hasn't kept up with the leaders in the field and won't win many new converts. Jul 94

★★★ **Managing Your Money 6.0, MECA Software, 203/255-1441, $79.95.** Personal-finance program does a good if somewhat roundabout job of keeping track of your total financial picture. Although it isn't as easy to use as the competition, it excels in tax, investment, and financial planning. Jun 94

GRAPHICS

★★★★ **Adobe Illustrator 5.5, Adobe Systems, 415/961-4400, $595.** Despite slight speed disappointments, this draw program's upgrade is a bargain. It includes more than 200 tile patterns, 220 fonts, and the Acrobat Distiller and Exchange utilities. Sep 94

★★★★ **Adobe Photoshop 3.0, Adobe Systems, 415/961-4400, $895.** Native Power Mac image-editing program both broadens its capabilities and simplifies its work environment in this dynamic upgrade. While not perfect, the pros far outweigh the cons. Jan 95

★★★★ **Aldus FreeHand 4.0 (4.0a), Adobe Systems, 206/622-5500, $595.** The new page-design and text-editing functions of this powerful draw program make it more than worth the price. Aside from some bewildering interface elements, it's outstanding. Mar 94

★★★★ **Blueprint 5.0, Graphsoft, 410/290-5114, $295.** For plain old 2-D drafting, this CAD software has a rich, easy-to-use feature set and is admirably fast. The Power Mac version in particular is a first choice for large architectural or engineering diagrams. Jan 95

★★★ **ClarisDraw 1.0, Claris Corp., 408/727-8277, $399.** For presentations without grand artistic pretensions, this draw program can be an effective tool. Considering the wobbliness of some of its features, however, $400 may be too much to pay. Jan 95

★★★ **Collage 1.0.1 (2.0), Specular International, 413/253-3100, $399.** Image-compositing software allows you to combine and composite multiple RGB images stored in PICT, TIFF, and Photoshop 2.5 formats. While it's functional and indisputably easy to use, its oversights, including slow screen redraw with no interrupt option, are nearly as numerous as its benefits. Jul 94

★★★ **Dabbler 1.0, Fractal Design Corp., 408/688-5300, $99.** Art-education and paint software provides an excellent paint set with an appealing if slightly quirky interface, at a great price. Nov 94

★★★★ **DeBabelizer Lite 1.0 (1.1), Equilibrium Technologies, 415/332-4343, $129.** Terrific graphics utility converts graphics files from one format to another. It offers a choice selection of capabilities at a nice, slim price. Aug 94

★★★ **DesignWorkshop 1.0 (1.1), Artifice, 503/345-7421, $895.** The accessible interface and versatile modeling environment of this 3-D modeling software may be worth the fairly high price, particularly for architectural-design conceptualization. May 94

★★★★ **ElectricImage Animation System 2.0, Electric Image, 818/577-1627, $7495.** Although the price may seem incredibly high, this software, with its extraordinary animation and image-rendering capabilities, is worth every penny for cinematic-production professionals. Dec 94

★★★ **Infini-D 2.5.1 (2.6), Specular International, 413/253-3100, $695.** Serviceable 3-D graphics program has a wide range of modeling, rendering, and animation options, with a straightforward interface. Feb 94

★★★★ **IntelliDraw 2.0, Adobe Systems, 619/558-6000, $129.** Wonderful general-purpose graphics package works well, does a great job of automating drawing tasks, and is straightforward. Despite its breadth of features, it always feels approachable. Sep 94

★★★★★ **Kai's Power Tools 2.0a (2.1), HSC Software, 310/392-8441, $199.** Phenomenally powerful suite of Photoshop plug-ins have an addictive quality typically associated with arcade games. There's no end to the automated effects you can generate and the artwork you can create. May 94

★★★ **Koyn Fractal Studio 2.02 (2.1), Koyn Software, 314/878-9125, $119.95.** Software lets you generate beautiful fractals of your own design. It's a reasonable choice if you are interested in Sierpinski triangles or naturalistic forms, but it's not an all-fractals-for-all-people program. Aug 94

★★★★ **KPT Bryce 1.0, HSC Software, 805/566-6200, $199.** For less than $200, you get a remarkable 3-D landscape-rendering program, a CD-ROM full of images, a slide-show utility, and even some screen-saver modules. Although the innovative, graphics-heavy interface can be confusing, this software is lots of fun. Dec 94

★★★ **Live Picture 1.5.5, HSC Software, 805/566-6200, $3995.** At its core, this image editor is a promising program rather rudely assembled atop some marvelous technology and burdened by an extremely high price tag. Though fast and blessed with all the benefits of a proxy-based system, its day-to-day functions leave plenty of room for improvement. Dec 94

★★★★ **LogoMotion 1.0, Specular International, 413/253-3100, $149.** Easy-to-use 3-D package is eminently affordable. It's a terrific program, both for creating flying logos and as an entry-level 3-D package for nonprofessionals. Nov 94

★★★★ **MacroModel, Macromedia, 415/252-2000, $1495.** This 3-D modeling software is a solid resource to have along when you venture out into 3-D space. The interface is elegantly simple, making the Mac's inner space a more pleasant place to work. May 94

★★★★ **MetaFlo', The VALIS Group, 415/435-5404, $595.** Graphics utility yields interesting visual effects with a minimum of fuss. It imparts elasticity to 2-D images, letting you push and pull collections of pixels while retaining the visual integrity of the image. Aug 94

★★★★ **MiniCad 5, Graphsoft, 410/290-5114, $795.** Excellent CAD software for the Power Mac offers major performance for its price. It's admirably easy to learn. Nov 94

★★★★ **Paint Alchemy 1.0, Xaos Tools, 415/487-7000, $99.** For the price, these plug-in graphics effects are a tremendous value that both casual users and professional artists can use to design a little chaos into their work. May 94

★★★ **PhotoMatic 1.01, DayStar Digital, 404/967-2077, $199.** AppleScript-based utility lets you automate tasks in Adobe Photoshop 2.5.1 or later. Although it's limited, it can relieve you of some mundane chores. Nov 94

★★★ **Pointillist, Pictor GraFX, 310/865-0495, $39.95.** Stereogram software creates images that look, at first glance, like random dots, but as you focus beyond the page, a 3-D image emerges from the pattern and appears to hover inches in front of the background. It's gleefully wacky. Jul 94

★★ **Ray Dream Designer 3.0.3 (3.1), Ray Dream, 415/960-0768, $349.** Although this 3-D-illustration software remains a price leader, unstable operation, misbehaving features, and sluggish performace are problems that need to be rectified. Jul 94

★★★ **ScanPrepPro 1.2, ImageXpress, 404/564-9924, $695.** Adobe Photoshop add-on automates scanning and image massaging and produces good results,

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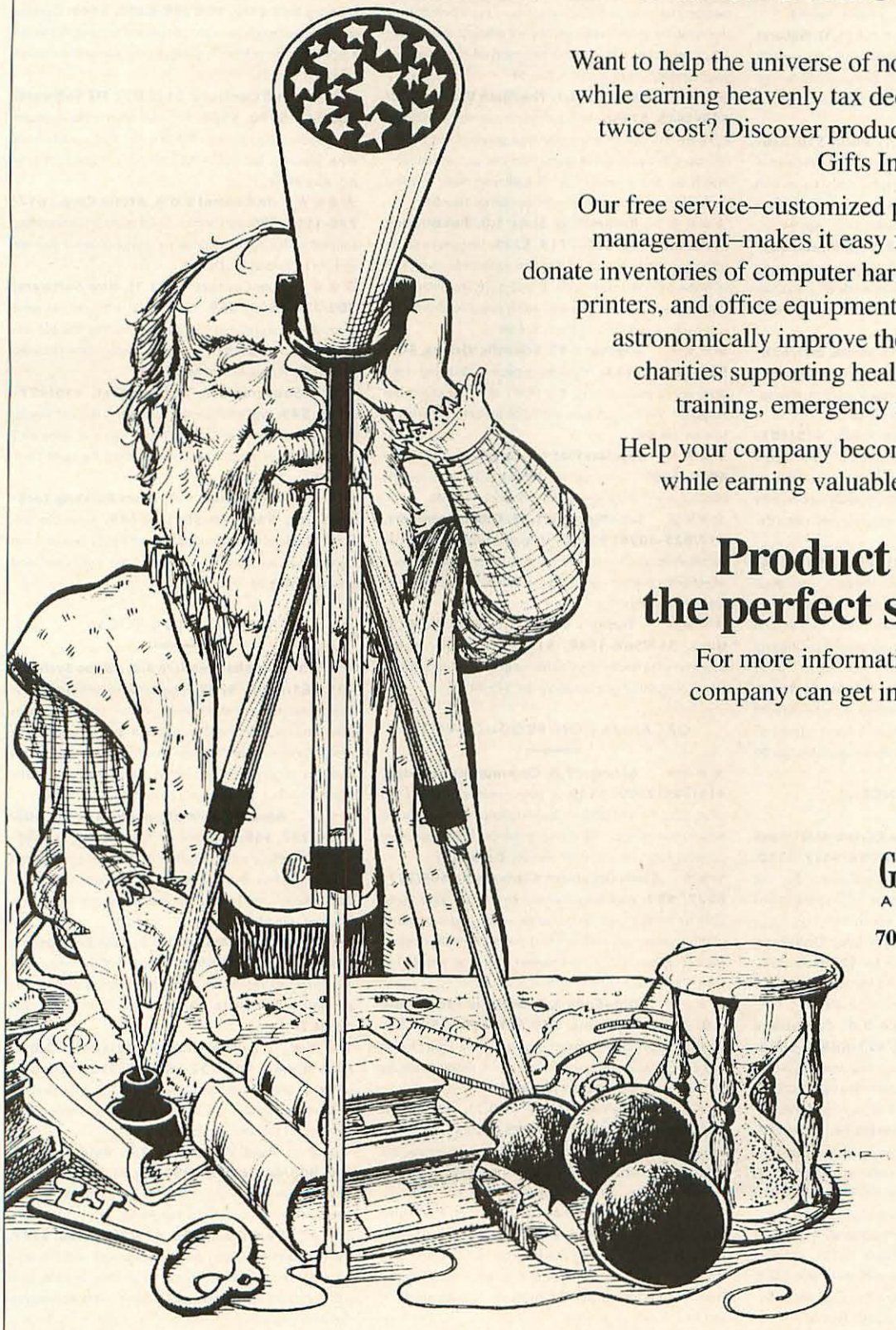

Galileo Galilei, Astronomer and Physicist, 1564-1642

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Star Ratings

although the program is somewhat unstable. Nov 94

★★★★ **Scenery Animator 1.0.4 (1.1), Natural Graphics, 916/624-1436, $149.** Landscape rendering and animation software uses U.S. Geographical Survey data to create remarkably realistic 3-D representations of terrain. Aug 94

★★★★ **Showplace 2.0 (2.1), Pixar, 510/236-4000, $495.** Adequate, entry-level, 3-D modeler is suitable for illustration and other graphic arts. This version offers improved access to MacRenderMan, one of the best renderers around, plus plug-in modeling tools. Apr 94

★★★ **StrataVision 3d 2.6.3 (3.1), Strata, 801/628-5218, $695.** 3-D program includes animation, and is a superior rendering tool and versatile modeler. It's a challenge to learn, however, as the interface is overly dense and sometimes sluggish. Feb 94

★★★★ **StudioPro 1.0 (1.1), Strata, 801/628-5218, $1495.** If you need a well-balanced, all-in-one 3-D modeling, rendering, and animation solution, this application is an excellent choice. Mar 94

★★★ **Terrazzo 1.0, Xaos Tools, 415/487-7000, $199.** Turning a random group of pixels into a geometric pattern may not be everyone's consuming passion, but this plug-in graphic-effects module has definite appeal for a select niche of fabric, graphic, and video designers. Nov 94

★★★ **Typestry 2.0 (2.1), Pixar, 510/236-4000, $299.** An approachable interface, animation support, and outstanding Renderman rendering technology make this 3-D type-renderer a popular choice. This version improves on the original, but still lacks canned positioning effects. Jun 94

★★★★ **TypeTwister 1.0, Adobe Systems, 415/961-4400, $29.95.** Inexpensive, easy-to-use, and fun type styler lets you create wildly styled text effects, although it won't satisfy hard-core type manipulators. Jan 95

MATH/SCIENCE

★★★★ **Caduceus Science Review Macintosh Project 1.0 (1.1), Scientia, 617/776-3427, $250.** If you're taking the MCAT, you'd be nuts not to buy this interactive science review. With proper use, its 9MB of files are certain to improve your score. Apr 94

★★★★ **Chamber Works 1.0.2, OnScreen Science, 617/776-6416, $79 to $249.** Simulator for particle-physics events is the best introduction to particle physics yet produced, at a great price. Dec 94

★★★★ **CSC ChemOffice 2.0, Cambridge Scientific Computing, 617/491-6862, $995.** Comprehensive chemistry software is the Mac equivalent of software that seven years ago would have cost $200,000 and required a costly minicomputer. It's a winner. Feb 94

★★★★ **JMP 3.0, SAS Institute, 919/677-8000, $695.** This statistics software can be used for a wide range of physical-science investigations. New features include floating tool palettes, an annotation tool for data tables, and an experimental-design module. Sep 94

★★★ **Kekulé 1.1, PSI International, 410/821-5980, $495.** Science software reads scanned chemical-structure drawings and interprets them, giving both a diagram for checking interpretation accuracy and a formal string representation of the structure. Nov 94

★★★★ **LabView for Mac 3.0.1, National Instruments, 512/338-9119, $1995.** For large-scale, demanding projects in data acquisition and analysis, this scientific software is an unchallenged standard. Jul 94

★★★ **Maple V 3.0, Waterloo Maple Software, 519/747-2373, $795.** If you prefer to do your own programming and function creation, you'll benefit from this symbolic mathematics software's efficient use of your Mac's resources. This version hits most of the points on your symbolic-math wish list. Oct 94

★★★★ **MATLAB 4.1, The Math Works, 508/653-1415, $1695.** Relatively expensive numerical math software has added nearly 100 new graphics commands, improved its treatment of sparse matrices, and added commands for sound processing. Its toolboxes make it a first choice for many applied-science specialties. Nov 94

★★★★ **Resampling Stats 1.0, Resampling Stats, Inc., 703/522-2713, $225.** Innovative statistics software has proved itself to be a superior teaching tool in numerous classroom tests. If you have any interest in statistics, you should give this admirably straightforward approach careful consideration. Jun 94

★★★★ **SerePlot 2.12, Scientfic Visions, 301/593-0317, $135.** If you have piles of data and don't need animated, exploding bar-charts in 24-bit color, this scriptable plotting software should be part of your analysis tool kit. Jun 94

★★★★ **Spyglass Plot 1.0, Spyglass, 217/355-6000, $295.** This scientific-charting software is the first choice for serious large-set plot crunching. Oct 94

★★★★ **SuperScope II 1.25, GW Instruments, 617/625-4096, $1490.** Despite a relatively small instrument library, this laboratory data-acquisition software effectively covers a wide range of needs, and learning to use it won't become your life's work. Oct 94

★★★★ **Turing's World 3.0, CSLI Publications, 312/568-1550, $19.95.** Computer-science educational software lets you investigate some fundamentals in computing at a bargain price. Feb 94

ORGANIZATION/PRODUCTIVITY

★★★★ **Arrange 2.0, Common Knowledge, 415/325-9900, $349.** If your needs fall beyond the usual calendar and address-book functions, this personal information manager is a strong contender. It now has more calendar functions and print options. Dec 94

★★★ **Claris Organizer, Claris Corp., 408/727-8227, $99.** New personal information manager users, lured by the low price, good performance, and ease of use of this product, will probably find that it meets their needs. Most longtime PIM users, however, won't be tempted to switch. Jan 95

★★★★ **DateBook & TouchBase Pro Bundle 4.0, Adobe Systems, 619/558-6000, $89.99.** Personal information manager package is now easier to use and offers many new features. It features excellent linking between contacts and calendar. Sep 94

★★★ **DateView 1.0.1 (1.0.2), Advanced Software, 515/225-4163, $99.95.** If you're willing to sacrifice some features to get simplicity and speed, this calendar/to-do manager makes sense. It integrates with the contact manager, InTouch. Aug 94

★★★ **Dynodex for Macintosh 3.5, Portfolio Software, 802/434-6400, $69.95.** Although this program doesn't currently link to a calendar, it is an excellent contact manager. This upgrade has a few new features, improved performance, and an easier-to-use interface. Sep 94

★★★ **FastPace Instant Contact 1.0, Foresight Technology, 817/731-4444, $79.99.** Although this contact manager could use a few additional features—especially a menu-bar search function—it does a capable job, and it is intuitive and easy to use. Jan 95

★★★ **First Things First Proactive 1.1, Visionary Software, 503/246-6200, $149.** Capable scheduling program has some convenient features. It's worth a look if you don't have to share information with a contact manager. Nov 94

★★★ **Full Contact 2.01 (2.02), FIT Software, 408/562-5990, $169.** Personal information manager can handle with speed and style tasks that would choke other products, but frequently, using it feels like a full-time job. Aug 94

★★★★ **In Control 3.0.4, Attain Corp., 617/776-1110, $85.** Excellent to-do-list manager and outliner, coupled with a good calendar is a strong choice if you live and die by to-do lists. Oct 94

★★★ **Now Contact 1.0 (1.1), Now Software, 503/274-2899, $69.** This contact manager has some innovative features and could easily become the top address-book program for the Mac by adding some features, such as file reconciliation. Mar 94

★★ **Souvenir 2.2, ComposeTel, 415/327-0744, $49.** While this contact manager is fast and simple, it's hard to recommend it when you can buy integrated contact managers and schedulers for about the same price. Dec 94

★★★ **TimeSquare 1.0, Team Building Technologies, 514/278-3010, $149.** Fast, flexible, network calendar program has lots of handy features, but it's missing a few as well, such as multiday events and label grouping. Aug 94

PRESENTATION TOOLS

★★★★ **Adobe Premiere 4.0, Adobe Systems, 415/961-4100, $795.** Video-editing software for the Power Mac remains as solid and reliable as previous versions, and also advances far and above its competitors with new and improved professional-level features. With the right hardware, it can give desktop-video editors broadcast-quality products with a minimum of compromises. Dec 94

★★★ **Amazing Animation, Claris Corp., 408/727-8277, $59.** Cute pictures, funny sounds, and a kid-friendly interface come together in this package that lets children produce short animations or interactive presentations. The canned animations and scenes grow tiresome, however. Jan 95

★★ **Animation Master 2.0.5, Hash Enterprises, 206/750-0042, $699.** Although this animation software packs extraordinary power at a reasonable price, it's needlessly difficult to learn and prone to instability. Oct 94

★★★★ **Authorware Professional 2.0.1, Macromedia, 415/252-2000, $4995.** Multimedia-scripting and -presentation software lets you develop complex presentations with amazing speed. Although expensive, it's wonderfully done. Feb 94

★★★ **Avid VideoShop 2.0, Avid Technology, 508/640-6789, $499.** QuickTime video-editing program shines in its intuitive, easy-to-use interface, although it may fall short on features. Feb 94

★★★ **Deck II 2.1, OSC, 415/252-0460, $399.** AV Macs turn into digital-audio workstations with this software that enables you to record, mix, modify, and play back CD-quality sound. It doesn't include equalization features. Jun 94

★★ **Elastic Reality 1.0 (1.2), Elastic Reality, 608/273-6585, $349.95.** Exciting morphing tool can create professional-caliber results—if you can figure out how to use it. Feb 94

★★★★ **FlipBook 1.0, S. H. Pierce, 617/338-**

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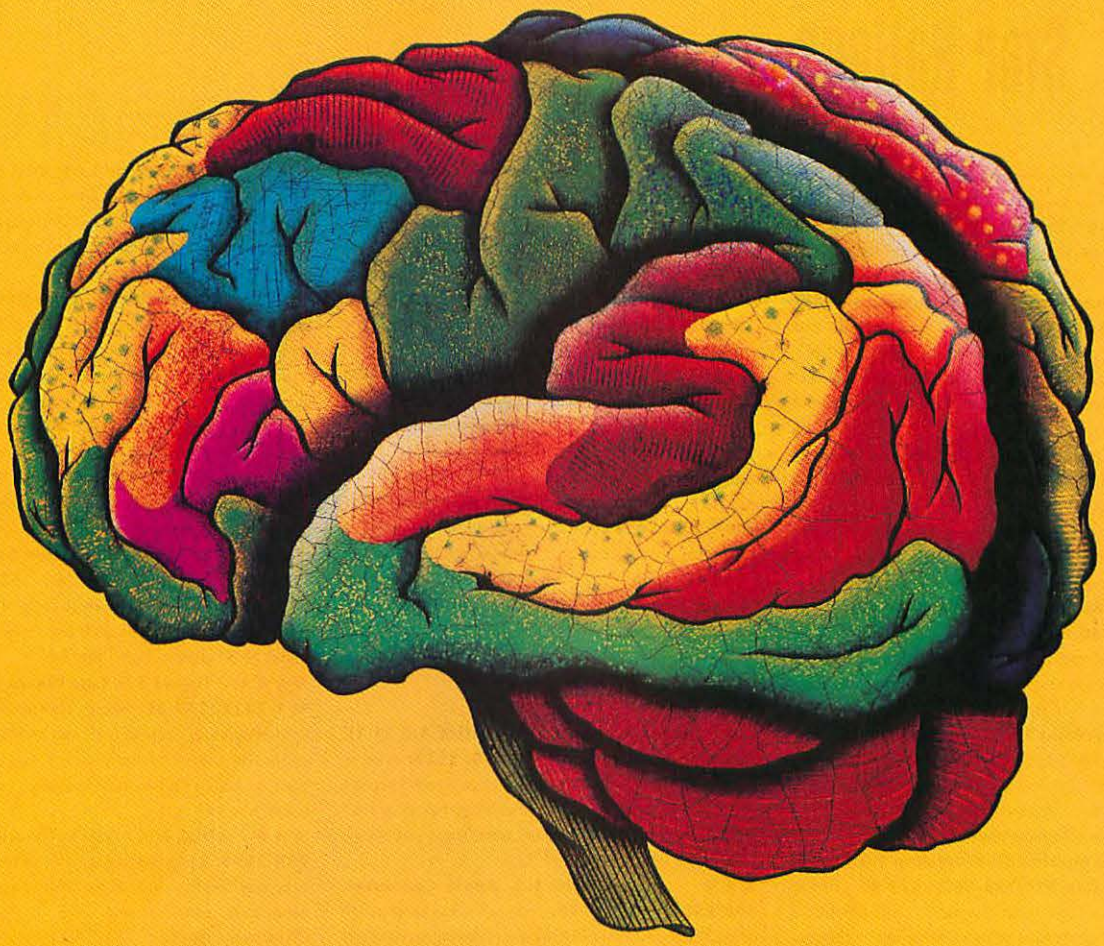

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Star Ratings

2222, $89. Animation printing utility lets users make flipbooks (consisting of a series of printed images that, through application of an extremely technical thumb-and-forefinger method, appear to move) out of QuickTime movies, PICS animations, and Scrapbook files. Jun 94

★★★ **HyperCard 2.2, Apple Computer, 408/996-1010, $249.** Authoring tool strikes a good balance between power and ease of use, and its price is reasonable. It may not satisfy all your wishes, but it should keep you happily building stacks until the next version comes along. Sep 94

★★★★ **Macromedia Director 4.0, Macromedia, 415/252-2000, $1195.** Although this multimedia program remains far from easy to use, this admirable upgrade increases the program's power and improves its interface. Multimedia professionals will continue to find it the best package available. Sep 94

★★★★ **Morph 2.0 (2.5), Gryphon Software, 619/454-6836, $239.** Easy to use morphing software is beautifully designed, with delightful new features, including the ability to morph QuickTime movies. Using it is as painless as morphing gets. Apr 94

★★ **MovieWorks 2.0.2, Interactive Solutions, 415/377-0136, $295.** With diligence you can get decent results with this all-in-one QuickTime-based multimedia package. But other entry-level programs make leaping into multimedia easier and more rewarding. Sep 94

★★★ **The Multimedia Workshop 1.0, Davidson & Associates, 310/793-0600, $79.95.** Children or adults can use this media-integration tool without big investments of either time or money. It's full of compromises, though, such as the inability to layer narration over music. Nov 94

★★★ **Passport Producer Pro 1.0 (1.1.2), Passport Designs, 415/726-0280, $995.** Superb, albeit quite expensive, media-integration package makes assembling even complex presentations surprisingly easy. Path animation is limited to entrances and exits. Apr 94

★★★★ **Persuasion 3.0, Adobe Systems, 206/622-5500, $339.** Users have plenty of new features to cheer about, including improved tool palettes, extensive charting options, and hypertext functions with this presentation graphics program's upgrade. High memory and disk-space requirements are drawbacks, however. Sep 94

★★★ **QuickFlix 1.0 (1.1.1), VideoFusion, 419/891-1090, $149.** Approachable QuickTime movie making software lacks the high-end features of other programs but costs a whole lot less. Feb 94

★★★ **SoundEdit 16, Macromedia, 415/252-2000, $379.** Digital audio software supports 16-bit sound and has enough goodies to earn it a place in a multimedia producer's toolbox. But its lack of record-level controls limits its usefulness as a professional audio tool. Dec 94

PROGRAMMING

★★★★ **IDL 3.5, Research Systems, 303/786-9900, $1500.** In this shockingly powerful, compact, graphics-oriented, interpreted language, a single command is worth a page of C-language code. If you're an image processing professional, you should consider adding it to your tool kit. Oct 94

★★★★ **Object Master for Think C and C++, ACI US, 408/252-4444, $255.** Object-oriented development environment is full of goodies and will pay for itself in about a week due to increased programmer productivity. Apr 94

★★ **ScriptWizard 1.0, Full Moon Software, 408/253-7199, $99.** Software attempts to make writing and debugging AppleScript scripts easier but doesn't offer enough improvement over Apple's Script Editor. Jan 95

★★★★ **Smalltalk/V for Macintosh 2.0 (2.02), Digitalk, 714/513-3000, $495.** Object-oriented development system is viable for commercial projects, while Digitalk's customer support and documentation set a standard other vendors should emulate. Feb 94

★★★ **VIP BASIC 1.0.1 (1.0.3), Mainstay, 805/484-9400, $295.** Popular programming language lets programmers who know BASIC get started producing real, if interpreted, Mac programs. It's a serious developer's tool, though not on the same footing as VIP-C. Jun 94

★★★★ **VIP-C 1.0.1 (1.5.1), Mainstay, 805/484-9400, $495.** If you've mastered the rudiments of C, this programming-code generator will let you code about ten times faster than you could using only an editor. Its real strength is in rapidly assembling smaller projects. May 94

UTILITIES

★★ **Apple Personal Diagnostics 1.0 (1.1), Apple Computer, 408/996-1010, $129.** In trying to make a hardware tool for the rest of us, Apple has come up short. This hardware-diagnostics utility has an uneven manual, some less than thorough tests, and a surprisingly unsatisfying interface. Nov 94

★★★ **AppleSearch 1.0, Apple Computer, 408/996-1010, $1799.** Although it has some rough edges, this product for archiving and retrieving text is highly useful. It presents retrieved information clearly and extracts text from documents in many formats. May 94

★★★ **Atticus Vista 1.0 (1.0.2), Atticus Software Corp., 203/348-6100, $69.95.** Control panel and application automatically catalog the disks you mount on the desktop. It has a few problems, including limited search options, but it can help bring order to disorganized disk collections. May 94

★★★★ **Automap Road Atlas for Macintosh 2.01 (2.04), Automap, 206/455-3552, $99.95.** Mapping software tells you how to get where you're going better than any other map or software our reviewer has seen. Although screen redraw is slow, it's worth it for the written directions and maps. Jul 94

★★★★ **Cal 1.0, Thought I Could, 212/673-9724, $79.95.** Well-chosen set of desktop necessities includes an excellent calculator, an associated-formula editor, a datebook, and a calendar. Due to its easy access and ample power, this software has become an everyday tool for our reviewer. Jan 95

★★★ **CD AllCache 2.0, CharisMac Engineering, 916/885-4420, $79.95.** CD-ROM accelerator improves access time by caching a CD's directory and putting its most frequently used data into RAM. Despite this software's limitations, most CD addicts will find the speed improvement worth the trouble. Sep 94

★★★★ **CD-ROM ToolKit 1.0.5 (1.1), FWB, 415/474-8055, $79.** Software accelerator can halve the time it takes to open files and search on a CD-ROM. The product supports a wide variety of formats and CD-ROM drives, but users should be aware that playback of QuickTime movies is often uneven. May 94

★★★★★ **Conflict Catcher II 2.1.1, Casady & Greene, 408/484-9228, $79.95.** Customizable, fast, and safe extension-management utility goes well beyond the basics. For Power Macintosh users, it even tells which extensions aren't written in native code and are likely to slow down Power Macs. Oct 94

★★★ **CryptoMactic 1.01, Kent Marsh, 713/522-5625, $99.** Security software offers fast Finder-level encryption and decryption with effective file removal. Although its simplest encryption algorithm isn't quite hacker-proof, it's worth considering. Feb 94

★★★ **DiskDoubler 4.0, Symantec Corp., 503/334-6054, $79.95.** In pure efficiency terms, this file-compression software is a winner, but it lacks many features of previous versions, including passwords on self-extracting files and automatic recompression. Aug 94

★★★★ **DiskTop 4.5 (4.5.1), PrairieSoft, 515/225-3720, $99.95.** Organizing a crammed hard drive is a more manageable task with this simple but powerful file-management utility that lets you copy, move, rename, delete, and find files—without using the Finder. Jul 94

★★★ **The Disney Collection Screen Saver, Berkeley Systems, 510/540-5535, $49.99.** Mickey, Goofy, Peter Pan, Ariel, and other Disney favorites cavort around your screen with this screen saver that includes 16 different modules. Mar 94

★★★★ **Drive7 3.0, Casa Blanca Works, 415/461-2227, $79.95.** Highly recommended hard drive-formatting utility easily formats and partitions most drives and provides all the options you need. And within its limitations, its Mount Cache utility provides a real performance boost. Nov 94

★★★ **eDisk 2.0, Alysis Software Corp., 415/928-2895, $149.95.** Driver-level software compresses data read to your drive on the fly and automatically expands data read from your drive. It offers transparent compression. Dec 94

★★★★ **Icon Mania 1.0 (1.01), Dubl-Click Software, 503/317-0355, $69.95.** Delightful icon-editing utility comes with terrific tools for building new icons, including an outstanding thumbnail feature that builds custom icons from graphics files. Aug 94

★★★★ **Launch Pad 1.0, Berkeley Systems, 510/540-5535, $49.99.** If you want to share your Mac with your kids, this desktop utility is a worthwhile investment. It can even speak menu items and file names out loud for kids too young to read. Jan 95

★★★★ **MacTools 3.0, Central Point Software, 503/690-8090, $149.** Recovering trashed files is a snap with this utility package that fixes more disk problems than its competition. It includes disk-and-file maintenance, disk repair, virus protection, and backup. Mar 94

★★★★ **Maxima 3.0, Connectix, 415/571-5100, $99.** If you have more than 8MB of RAM, you can use some of it as a RAM disk, speeding up disk-based operations, with this inexpensive utility. Nov 94

★★★★ **Now Utilities 5.0, Now Software, 503/274-2800, $89.** Three of the modules of this finetuned, interlocking utility set—Now FolderMenus, Now Menus, and Now SuperBoomerang—are almost indispensable, and while the other six may not be the tops in their category, they're well worth considering. As a collection, this package remains the best in the business, and it's Power Mac–native. Jan 95

★★★ **Open Sesame 1.02 (1.1), Charles River Analytics, 617/491-3474, $99.** Utility automates Finder operations, such as opening, without macros or scripts. It has an elegant interface, but people with strict work habits are more likely to find its suggestions worthwhile than are those who don't follow a routine. May 94

★★★ **OptiMem 1.4.1 (1.5.6f), Jump Development Group, 412/681-2692, $129.** Systemwide memory manager monitors RAM use and allocates RAM

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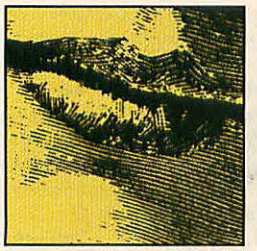

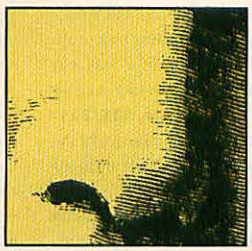

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Star Ratings

where it's needed. Works best with software that handles minimum-memory situations effectively. Mar 94

★★★ **Peirce Print Tools 1.0, Peirce Software, 408/244-6554, $129.** Nine handy printing utilities work with QuickDraw GX. Most of the modules are useful, but not all are must-haves. Jan 95

★★★ **PopupFolder 1.0 (1.5), Inline Software, 617/935-1515, $59.95.** Finder utility is so handy and easy to use, you wonder why it isn't built into the Mac's system software. On the other hand, it's sluggish when readying pop-up menus for every folder. Aug 94

★★★★ **PowerAgent 1.1, SouthBeach Software Corp., 305/858-8416, $159.** You can revolutionize your Macintosh work with this agent program that manages scripts. It provides excellent support for FileMaker Pro, but unfortunately in many other mainstream applications scripting is difficult to implement. Nov 94

★★★★ **PowerMerge 2.0, Leader Technologies, 714/757-1787, $129.** Powerful file-management tool helps you keep individual files, folders, or entire volumes organized and up-to-date. This version lets you compare and launch documents, rename files, trash superfluous files, and lots more. Aug 94

★★★ **ProFiles 1.0, Dayna Communications, 801/269-7200, $129.** Unusual new utility lets you group related files and folders for quick access and actions such as making aliases, copying, turning sharing on and off, and more. The recommended RAM allocation of 1MB may be a problem for computers with limited memory. Aug 94

★★★★ **QuicKeys 3.0, CE Software, 515/221-1801, $139.** The simple, unintimidating interface of this macro-building utility allows you to build a set of useful shortcuts quickly. Mar 94

★★★★ **RAM Doubler 1.0.1 (1.5), Connectix Corp., 415/571-5100, $99.** Inexpensive system extension doubles available RAM for many Mac users. There are a number of requirements, however, including System 7, 4MB of physical RAM, and a 68030 board. May 94

★★★★ **SAM 3.5.8 (4.0), Symantec Corp., 503/334-6054, $99.** Efficient, thorough virus-protection software slows down system start-up and application launching, but this program is a worthwhile investment for anyone who exchanges or downloads files. Mar 94

★★ **SCSI Director Pro 3.0.6, Transoft Corp., 805/565-5200, $99.** Utility provides simple, one-button hard disk formatting, but when it comes to doing some of the fancy tricks described on the program's box, the going gets rough and technical support costs $1.90 per minute. Sep 94

★★★★ **Square One 2.0, Binary Software, 310/449-1481, $74.** The slick design, flexibility, and straightforward interface of this file-launching utility make it a pleasure to use. Dec 94

★★★ **Stop & Go 4.0, Engram International, 415/455-1100, $69.99.** File-protection/relaunch utility uses a portion of your hard disk to save a snapshot of the data in your Mac's RAM. It's fast, and it relaunches files, applications, and extensions in a single, unified process, but it's unduly complicated. Oct 94

★★★ **Tempo II Plus 3.0.9 (3.0.9a), Affinity Microsystems, 303/442-4840, $179.95.** Very capable macro-creating utility may be daunting for novices but offers plenty of power for advanced users. Mar 94

★★★★ **TimesTwo 2.0, Golden Triangle Computers, 619/587-0110, $149.** This driver-level compression utility is transparent and robust. It caused no problems through a two-month course of testing, on a system with myriad utilities and system software tools. Mar 94

★★★ **UnderWare 1.0.1, Bit Jugglers, 415/968-3908, $59.95.** Inspired, silly fun for your Mac's desktop comes from a control panel that adds three features: a screen saver, desktop patterns, and animations that run on your desktop while you work. The price for this whimsy is mostly in disk space. Jun 94

★★★★ **Virex 5.0 (5.03), Datawatch Corp., 919/549-0711, $99.95.** The extremely fast, trouble-free performance of this software makes the task of guarding against computer viruses almost painless. Its speed puts it ahead of the pack. May 94

★★★★ **VirtualDisk 1.1a (2.0), Continuum Software, 206/695-8136, $79.** Rapid disk cataloging; fast, efficient label-printing; and an excellent disk-copy utility make this software package a wonderful value. Jul 94

★★★ **Wiz Tools for PowerBook 1.2.2, ASD Software, 909/624-2594, $79.95.** The connectivity, fine synchronizing, and security features of this collection of PowerBook utilities are appealing, but the rest of the modules are also-rans. Jan 95

VERTICAL MARKETS

★★★ **Bird Brain 2.01, Ideaform, 515/472-7256, $125.** Database lets bird watchers record every sighting of every bird they have ever seen to create electronic life lists. Although it can be slow, it includes species names and other information. Jan 95

★★★★ **Claire, The Personal Music Coach 1.0.1, Opcode Systems, 415/856-3333, $129.95.** Musicianship program teaches pitch and interval recognition, sight singing, and intonation. Although the interface is nonstandard, it's logical and easy to learn. May 94

★★★ **ErgoKnowledge 1.0, Visionary Software, 503/246-6200, $395.** Despite a few shortcomings, this CD-ROM offers a good, basic review of office-computer ergonomics. Dec 94

★★ **MacInteriors 1.0 (1.2), Microspot, 408/253-2000, $129.** Correctly placing objects is unduly cumbersome in this interior-design software, but once you catch on to the program's quirks, it's useful. Feb 94

★★★★ **Mayo Clinic Family Health Book 1.2, IVI Publishing, 612/686-0779, $69.95.** Medical CD-ROM for home use deals with the full gamut of health-care topics, from AIDS to zygotes, although it doesn't include any reference to alternative therapies. Sep 94

★★★ **Mayo Clinic: The Total Heart 1.0, IVI Publishing, 612/686-0779, $59.95.** Cardiovascular health and related subjects are the topics of this medical CD-ROM for home use. Although it makes liberal use of drawings, photographs, and animations, video sequences would have been more effective. Sep 94

★★★ **MusicTime 2.0, Passport Designs, 415/726-0280, $149 to $249.** Music-notation program is geared for hobbyists and students. If your needs aren't complex, it may fit the bill, at a great price. Oct 94

★★★★ **Practica Musica 3.0, Ars Nova Software, 206/889-0927, $140.** Music-teaching program, with emphasis on sight-reading and ear-training techniques, shines as a smart, infinitely patient personal music coach in the classroom. Jan 95

★★★ **SAM-CD, Scientific American Medicine, 212/754-0550, $395.** Despite a few shortcomings, such as the poor interface for case simulations, this medical reference work—a popular series of publications covering topics in clinical medicine—should prove a worthwhile addition to any medical library. Sep 94

★★★★ **WillMaker 5.0, Nolo Press, 510/549-1976, $69.95.** Legal software quickly and easily automates the creation of wills, health-care directives and proxies, and final-arrangements documents. It offers excellent supporting explanations, examples, and background. Jun 94

WRITING TOOLS

★★★★ **MacWrite Pro 1.5 (1.5 v2), Claris Corp., 408/727-8227, $249.** The clean, uncluttered interface of this low- to middle-level word processor is still one of its major assets. This upgrade adds support for QuickTime, PowerTalk, AppleScript, and more. May 94

★★★★ **OmniPage Professional 5.0, Caere Corp., 408/395-7000, $695.** In a historic first for OCR, this Power Mac software has an accuracy of 100 percent on good text samples. It does still make occasional baffling minor errors on real-world documents. Nov 94

★ **The Oxford English Dictionary, Oxford University Press, Electronic Publishing, 212/679-7300 ext.7370, $895.** CD-ROM dictionary contains 20 print volumes, including half a million words, but the flaws, omissions, unreliability, and unforgivably poor design are unbearable. Apr 94

★★★ **Random House Unabridged Dictionary, Random House Electronic Publishing, 212/572-2600, $179.** Dictionary on CD-ROM works within any program and is good at guessing misspelled words. Although some functions don't work reliably, the quality and design of the software are better than those of other dictionaries on CD-ROM. May 94

★★★ **TextBridge 2.0, Xerox Imaging Systems, 508/977-2000, $99.** Optical character recognition software is impressive on good documents and can be trained and automated. You won't find that anywhere else at this price. Sep 94

★★★★ **WordPerfect for Macintosh 3.0 (3.0a), WordPerfect Corp., 801/225-5000, $495.** The innovative interface of this word processor uses context-sensitive button bars and expandable rulers to make innumerable features accessible with a click of the mouse. It's an accomplishment in ease of use. Mar 94

★★★★ **WriteNow 4.0.1, WordStar International, 617/494-1200, $119.95.** Tidy word processor's conservative use of memory (the application fits into a dainty 600K partition) and graceful interface will continue to win it fans. This version adds elegant table capabilities and several PowerBook-friendly features. Jun 94

★★★ **Writing Coach 1.0, WritePlace Software, 503/484-6380, $89.** If you'd like help with your writing, this writing-skills tutorial could be a great investment. Skillfully worded worksheets assist with planning, organizing, and revising. Dec 94

Hardware

INPUT DEVICES

★★★ **DrawingSlate, CalComp Digitizer Division, 714/821-2000, $395.** Digitizing tablet is a good, compact, low-cost implementation of pressure sensitivity, although the battery-operated stylus is a bit heavy. Jun 94

★★★ **Ear Phone Streamline AV, Jabra Corp., 619/622-0764, $169.** As a hands-free telephony tool—and as a replacement for the Apple PlainTalk microphone—this telephone/speech-recognition earpiece is a winner. Its biggest drawback is that you can't hear other Mac sounds when it's plugged in. Jul 94

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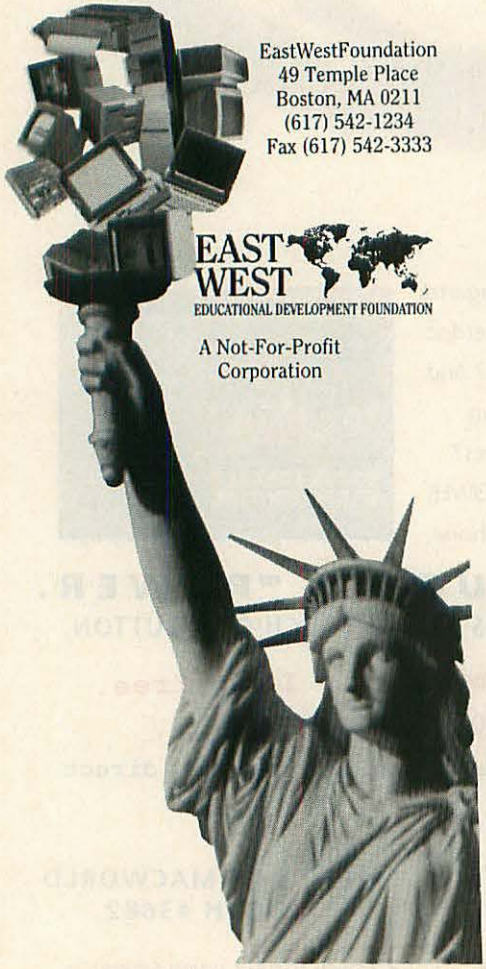

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★★★★ **FlightStick Pro for Macintosh, CH Products, 619/598-2518, $129.95.** The authentic look and feel of this joystick, along with well-conceived software, make it a nearly perfect desktop pilot's companion. Dec 94

★★★★ **Mac Keyboard Deluxe, MicroSpeed, 510/490-1403, $125.** If you're in the market for a new or replacement keyboard, this one, which is both smaller and lighter than Apple's Extended Keyboard, is worth considering. It has four ADB ports. Nov 94

★★★ **PenDirect ADB, FTG Data Systems, 714/995-3900, $398.** Input device lets you manipulate items on the Macintosh screen using a special stylus called a light pen. It works well, although it seems ergonomically inferior to a mouse for routine tasks. Mar 94

★★★ **TrakMate, Key Tronic Corp., 509/928-8000, $149.** Input device integrates a trackball into a wrist pad. While the design is interesting, it's not for everyone. Feb 94

★★★ **Wacom UD-1212R, Wacom Technology Corp., 206/750-8882, $749.** Graphics tablet with pressure-sensitive stylus is easy to use and highly customizable, though it's incompatible with AppleTalk and AppleTalk Remote. May 94

MISCELLANEOUS HARDWARE

★★★★ **AirNote 1.0, Notable Technologies, 510/208-4400, $349.** Remote-messaging service lets you originate alphanumeric paging messages from your own computer, eliminating both dictation charges and errors in translation. It's a very handy way to get into alphanumeric paging. Dec 94

★★ **G-Vox, Lyrrus, 215/922-0880, $399.** Hardware-software guitar-instruction package lets your Mac "hear" the notes you play on your guitar. Although the hardware works well, the software has some basic problems and doesn't live up to the hardware. Apr 94

★★★★ **IX-4015 Color Image Scanner, Canon Computer Systems, 714/438-3000, $1169.** The price of this color flatbed scanner is competitive, and its speed and excellent bundled software make it easy to use and a good choice for the small office. If you can get by without legal-size scans, it should serve you well. Jul 94

★★ **Macintosh TV, Apple Computer, 408/996-1010, $2079.** As a computer, this combination computer-television-CD player is sleek but slow. You can get faster performance and better expandability from several less-expensive Performa models. Apr 94

★★★ **RCD-202, Pinnacle Micro, 714/727-3300, $2495.** Writable CD-ROM drive is good for archiving data simply and inexpensively, but it's incompatible with many hard drives. Mar 94

★★★★ **SCSI Sentry, APS Technologies, 816/483-6100, $99.** Although the price of this terminator may seem steep, this device may well be the cure for SCSI woes. Our reviewer heartily recommends it. Sep 94

★★★★ **ThinPack, VST Power Systems, 508/287-4600, $199.95.** External battery pack for PowerBooks is compact, with a lightweight design. It comes with handy power-management utilities. Mar 94

★★★★ **TurboDialer, Advanced Software, 408/733-2364, $69.95.** Automatic telephone dialer is a well-executed product, except for occasional computer noise that seeps into phone conversations. Jul 94

★★★★ **Vivace, Coda Music Technology, 612/937-9611, $2295.** As an intelligent and endlessly patient accompanist, this music study system for wind instruments may be the best thing that's happened to learning wind literature since the metronome. Jan 95

★★★★ **Yamaha YST-M10 Powered Monitor Speakers, Yamaha, 714/522-9240, $149.95.** Powered speakers have a good balanced sound and a great volume range at an outstanding price. Apr 94

MODEMS/NETWORK HARDWARE

★★ **Cooperative Adapter, Photonics Corp., 408/955-7930, $349.** The high cost of each unit, the limitations and restrictions inherent in diffuse infrared, and the extremely low cost of traditional LocalTalk adapters and cabling make this infrared network interface an expensive niche product. Dec 94

★★★★ **Cypress PhonePro 1.2 (1.4), Cypress Research Corp., 408/752-2700, $349 to $950.** By improving its integration with FaxPro and with PowerTalk and PowerShare, this powerful telephony software has greatly extended its business scope. May 94

★★★ **DaynaPort Pocket SCSI/Link, Dayna Communications, 801/269-7200, $299 to $369.** Inexpensive, lightweight SCSI-to-Ethernet connector works with both desktop Macs and PowerBooks and can use the Mac's ADB port as a power source. Nov 94

★★★★★ **EtherWave, Farallon Computing, 510/814-5000, $129.** If you need to expand your network at a reasonable price with minimal fuss, get this Ethernet transceiver. Instead of providing only one 10BaseT twisted-pair jack, it includes a second jack that allows you to daisy-chain to another device through an additional 10BaseT line. May 94

★★★ **FastSwitch 10, Grand Junction Networks, 510/252-0726, $6250.** Switched Ethernet hub is a great solution for networks that handle large amounts of data traded peer-to-peer, but if your network consists of E-mail and a file server, you probably won't see much benefit in stepping up to switched Ethernet. Dec 94

★★★ **OneWorld Fax, Global Village Communication, 415/390-8200, $999.** Easy-to-use network fax product lets an office share fax-sending resources without dedicating a hard drive and CPU; however, it can't receive faxes and can't queue more than one fax document at a time from a single CPU. Aug 94

★★★ **Pocket EtherTalk Adapter, Xircom, 818/878-7600, $349 to 399.** All-in-one SCSI-to-Ethernet connector is lightweight and works with desktop Macs and PowerBooks. Nov 94

★★★★ **PowerPort Mercury/PB 500 Series, Global Village Communication, 415/390-8200, $399.** Top-notch fax modem is capable of exemplary fax and data communications performance. Nov 94

★★★ **Spectra-Com P192mx, Bay Connection, 408/270-8070, $199.95.** If you must have absolute portability and AC power isn't available, this pocket data/fax modem can do the job. It's not that much smaller than a regular desktop modem, however. Oct 94

★★★★ **SupraFaxModem 288, Supra Corp., 503/967-2410, $329.95.** This 28,800-bps fax modem is a very good performer, as good as or better than 14,400-bps modems, and the price of admission isn't terribly steep. Combined with fast, stable fax software and a good terminal program, it's hard to beat. Aug 94

★★★ **Watermark Message Central 2.0.2, High Tide Software, 510/704-9927, $499.** If you're willing to put in a lot of effort, you'll find this highly sophisticated voice-mail system supremely flexible. It includes a specially modified modem with voice chip, as well as fax software and telecommunications software. Jul 94

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PRINTERS

★★ **Brother HJ-400, Brother International, 908/356-8880, $369.** Compact, 360-dpi ink-jet printer is fairly slow and does not allow background printing. Some large files require additional application memory to print correctly. **May 94**

★★★★ **Color StyleWriter Pro, Apple Computer, 408/996-1010, $629.** Color printer represents one of the best values in the inexpensive color-printing market. It's fast, produces nice-looking output, and has some good features, including a great way of handling color ink cartridges. **Sep 94**

★★★★ **DeskWriter 310, Hewlett-Packard, 800/752-0900, $379 to $455.** Versatile, low-cost ink-jet printer is a 4.3-pound, battery-powered portable. With its 60-page sheet feeder, it's also a great desktop printer; and with a $49 color print cartridge, it offers inexpensive three-color printing. **Mar 94**

★★★ **HP LaserJet 4ML, Hewlett-Packard, 800/752-0900, $1279.** Primarily for those who use a PC or work in a small, mixed-platform environment, this energy-efficient laser printer offers automatic port and language switching and is a good buy. It may not be worthwhile for those who use Macs only. **May 94**

★★★★★ **LaserWriter Select 360, Apple Computer, 408/996-1010, $1599.** Low-cost, high-performance, 10-ppm printer is perfect for small LocalTalk or mixed networks. For bigger networks, *consider buying* more than one; they're more cost-effective than a 20-ppm printer. **Apr 94**

★★ **Notebook Printer II, Citizen America, 310/453-0614, $399.** If weight and size are your biggest concerns in choosing a portable printer, and you print primarily in black and white, this thermal-fusion printer may be a good choice. If speed is at all an issue, however, other options may be preferable. **Jun 94**

★★★★ **Personal LaserWriter 320, Apple Computer, 408/996-1010, $959.** If you've been holding out for a high-quality personal laser printer that's fast enough to share over LocalTalk, the small inconveniences of this 300-dpi printer are easily outweighed by its low price, good speed, and PostScript Level 2 support. **May 94**

★★★★ **PowerPrint 2.5, GDT Softworks, 604/291-9121, $149.** Ingenious hardware-software combo lets you print from your Mac to almost any PC printer. It supports over 1000 printers, ranging from aging dot matrix models to the newer color ink-jet and laser printers. **Sep 94**

★★★ **PrimeraPro, Fargo Electronics, 612/941-9470, $1895.** The photo-realistic output of this thermal-wax and dye-sublimation printer beats that of any other printer in the price range. But with expensive consumables and slow print time, it's best suited for routine thermal-wax use and occasional dye-sub work. **Jan 95**

★★★ **P-Touch PC, Brother International Corp., 908/356-8880, ext. 4307, $449.95.** Versatile label printer is easy to set up and use, and produces high-quality output. The cost per label is high, though, and the documentation is weak. **Sep 94**

★★ **QMS ColorScript Laser 1000, QMS, 205/633-4300, $7999.** Color laser printer succeeds in combining the versatility of monochrome laser printing with attention-getting color, but if you don't need to chase rainbows right away, you might wait and see if competition drives capabilities up. **Jul 94**

★★★ **Silentwriter 640, NEC Technologies, 508/264-8000, $825.** With 3MB of RAM, PostScript Level 2 support, and a 6-ppm engine, this printer is a ca-

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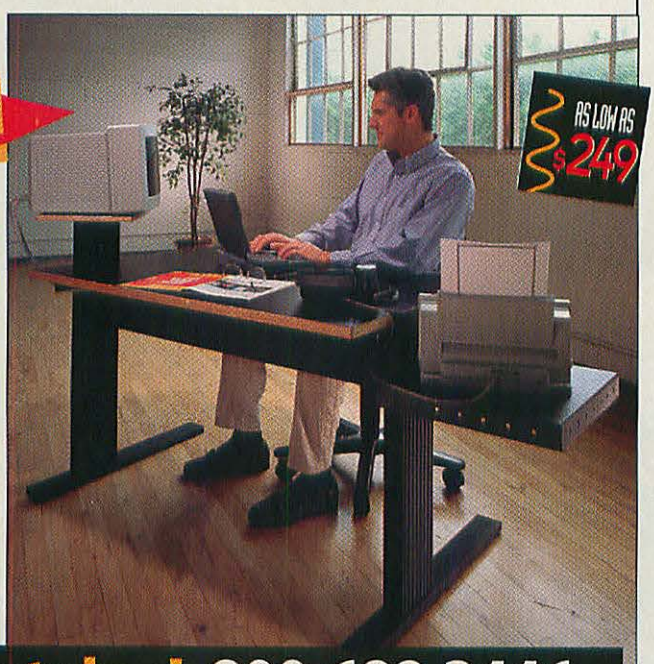

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pable performer. Generally, it represents hassle-free printing, but it doesn't handle single sheets of paper well. Jun 94

★★★ **Smart Label Printer Pro, Seiko Instruments, 408/922-5900, $299.95.** If you need to print only a few labels at a time, this label printer may be an expensive but good choice. It prints very quickly, and with excellent print quality. May 94

SYSTEMS/STORAGE

★★★★ **Alacrity PM 6100, KS Labs, 614/374-5665, $165.** Installing a clock booster is the quickest, easiest, and cheapest way to extract more power from Apple's entry-level Power Mac. Oct 94

★★★ **Conley SR2 RAID System, Conley Corp., 212/682-0162, $25,335.** While RAID technology is typically praised for fault-tolerance rather than speed, this high-performance storage system proves you can have both. For critical tasks requiring redundancy and round-the-clock operation, this is one of the best Mac RAID systems shipping. Sep 94

★★★ **EtherDock, E-Machines, 408/541-6100, $699.** Heavy-duty Duo docking option is equipped with a full set of 11 ports, including an Ethernet port. The locking mechanism is alarmingly wobbly—although reliable enough to ensure a good connection. May 94

★★★ **Expert Pad PI-7000, Sharp Electronics Corp., 800/237-4277, $899.** Personal digital assistant features the advantages of the Newton, in a better industrial design and at a comparative price. If the battery lasted longer and the message network were implemented, the PDA revolution could begin. Feb 94

★★★★ **LC 575, Apple Computer, 408/996-1010, $1699.** For students and small-business professionals who want high power and the convenience of having everything integrated into one case, this 33MHz 68040 system is an ideal choice. Jun 94

★★★ **Newton MessagePad 110, Apple Computer, 408/996-1010, $599.** This is the personal digital assistant that Apple should have shipped in August 1993, with improved handwriting recognition, including deferred and letter-by-letter recognition. It also has more memory, longer battery life, and a more efficient design. Aug 94

★ **NuTek Duet, NuTek USA Corp., 408/973-8799, $2996.** Mac workalike is both a PC and a Mac in a single box, but because of many incompatibilities and problems, the Duet is not a computer anyone should consider using for serious work. Feb 94

★★★★ **OrangePC Model 200 Series, Orange Micro, 714/779-2772, $1139 to $3237.** If your goal is to get a Mac that runs Windows as fast as a PC, you can't get there from here. If your goal is to get business-level performance for day-in, day-out use, these PC coprocessor cards are probably your best choice. Aug 94

★★★★ **PLI Infinity 270 Turbo, PLI, 510/657-2211, $651.** This 270MB SyQuest drive is fast, reliable, and a very good product. The cost of the medium is competitive with that of optical drives. Sep 94

★★ **PowerBook 150, Apple Computer, 408/996-1010, $1449.** Fast, lightweight portable is minimalist in the extreme, with no video-out, ADB, Ethernet, or microphone. Unfortunately, the price is less minimalist, and most budget-conscious shoppers would be better off buying a used or discontinued model. Dec 94

★★★ **PowerBook 540c, Apple Computer, 408/996-1010, $4839.** The prestige PowerBook du jour, this sleek, curvy and futuristic-looking notebook makes a good computer for both on-the-road and in-the-office use. Its nonstandard battery, memory, and Ethernet ports are not ideal features, however. Oct 94

★★★★ **PowerBook Duo 270c, Apple Computer, 408/996-1010, 4/240 $3099.** Notebook computer meets all the demands of power users; it weighs less than five pounds, features a color active matrix display, and offers longer battery life. The lack of a floppy drive can be inconvenient, though. Feb 94

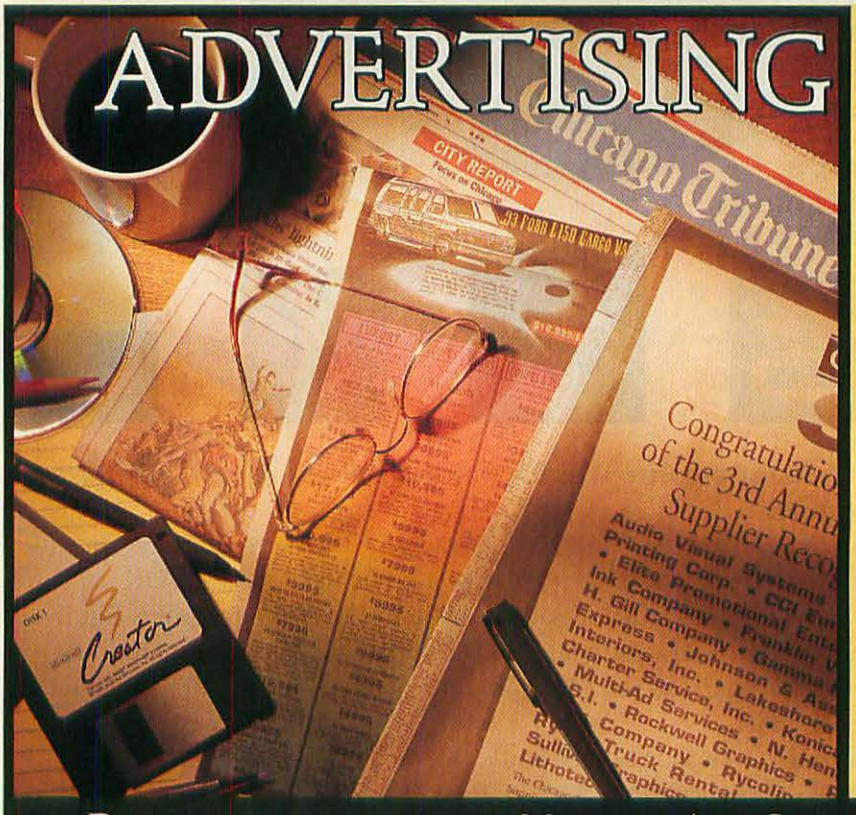
★★★★ **PowerBook Duo 280c, Apple Computer, 408/996-1010, $3759.** If you travel a lot, this notebook computer is hands down the best Mac to get. It offers close to the power of a Quadra 650 in a subnotebook. Oct 94

★★ **PowerBook Duo Dock II, Apple Computer, 408/996-1010, $969.** Apple has added Ethernet to this full-featured docking station, but installing NuBus cards is still absurdly difficult. If you don't need NuBus expansion, consider other options. Oct 94

★★★★ **Power Macintosh 6100/60, Apple Computer, 408/996-1010, base model $1819.** Given its price and performance, this Power Macintosh is hard to resist. When developers offer in PowerPC format the software that most business users run daily, this should be a system that will give you power to spare. Jun 94

★★★★★ **Power Macintosh 7100/66, Apple Computer, 408/996-1010, $2899.** Midrange Power Mac makes an outstanding workstation whose power should

continues



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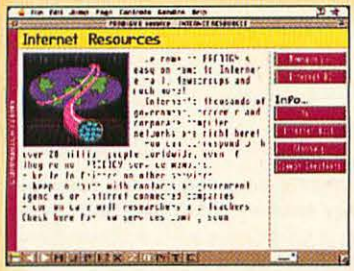

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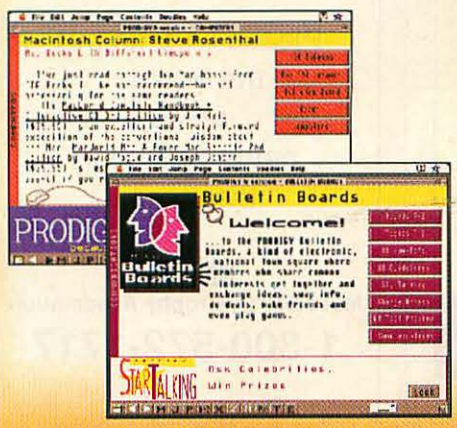

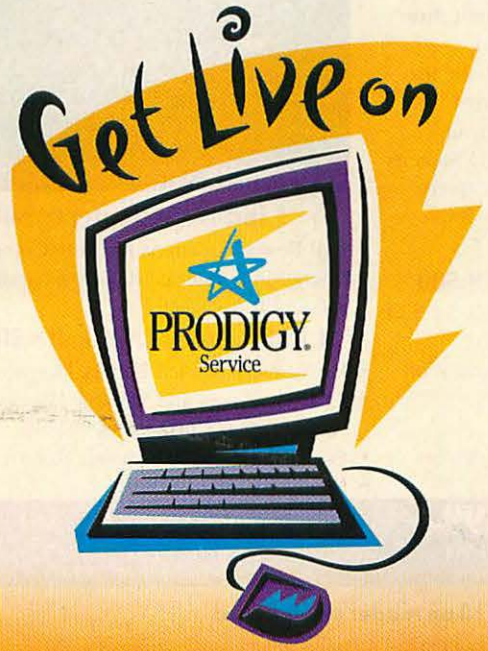

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Star Ratings

last for several years. The price is nothing to take lightly, but this system delivers every dollar's worth. Aug 94

★★★★ **Power Macintosh 8100/80, Apple Computer, 408/996-1010, $4249.** While this system doesn't quite offer the excellent price/performance ratio of the other available Power Macs, you should consider it if you're a high-end user moving your work over to RISC-based computing. Aug 94

★★★ **Power Macintosh Upgrade Card, Apple Computer, 408/996-1010, $699.** Current 33MHz 040 machines will get the best bang for the buck with this card, which is a less expensive upgrade path than a standard motherboard replacement. However, other Macs won't realize as much of a performance gain. Oct 94

★★★★ **Quadra 605, Apple Computer, 408/996-1010, 4/80 $979.** Never before has Apple offered so much performance for so little money. The performance and price of this 040-based machine match those of a standard entry-level 486SX-based Windows PC. Mar 94

★★★★ **Quadra 630, Apple Computer, 408/996-1010, $1279.** Fast, inexpensive, expandable 33MHZ 68040 machine may be the last 680X0-based desktop Macintosh, but it's one of the best entry-level Macs ever. Nov 94

★★★ **SCSI MicroDock, Newer Technology, 316/685-4904, $175.** Tiny Duo docking station is just under 41/2 ounces and barely 5 inches long. It adds only an ADB port and a SCSI port—but both are useful. May 94

★★★★ **SledgeHammer2000FMF, FWB, 415/474-8055, $3179.** RAID drive is both fast and inexpensive. Although it can be a bit noisy when accessing data, it's a good deal. Apr 94

VIDEO/DISPLAY

★★★ **Apple Macintosh Display Card 24AC, Apple Computer, 408/996-1010, $1579.** 24-bit accelerated graphics card offers a satisfactory price/performance ratio, although it can't switch resolutions from the keyboard. Oct 94

★★★ **Apple QuickTake 100 for Macintosh, Apple Computer, 408/996-1010, $749.** If you're hunting for a medium-quality, digital color camera under $1000, this is the best deal. But you may want to wait until some of the camera's problems, such as its fixed-focus lens and lack of a zoom option, are ironed out. Jul 94

★★★★ **FlexCam, VideoLabs, 612/988-0055, $595.** Small, unobtrusive desktop video camera has a flexible gooseneck for positioning. Dec 94

★★★ **Intellicolor Display/20, Radius, 408/434-1010, $2399.** Although with its exceptional brightness and clarity this monitor would be a fine addition to any designer's desk, the included Intellicolor software, which lets you control the settings of your display, doesn't offer much added value. Apr 94

★★★ **L-TV Portable, Focus Enhancements, 617/938-8088, $299.** Sturdy, cheap, external TV-converter plugs into your Mac and converts video output to NTSC. It gave a crisp, clean image, but persistent mild flickering and conspicuous shimmers. Aug 94

★★★ **L-TV Pro NuBus, Focus Enhancements, 617/938-8088, $399.99.** NuBus card converts your Mac's RGB video signal to NTSC so you can use your Mac with a TV or VCR. It supports a wide range of Macs, but the image has some flicker and distortion, despite flicker-filtering software. Aug 94

★★★ **The Presenter Plus Mac/PC, Consumer Technology Northwest, 503/643-1662, $429.** Small, external TV-converter supports output to television from most Macs with built-in video. It does a barely passable job of providing a stable image. Aug 94

★★★ **QA-350 LCD, Sharp Electronics Corp., 800/237-4277, $2495.** At less than half the cost of a typical active matrix LCD panel, this passive matrix projection panel offers an economical alternative for presenters who don't need multimedia capability. Jul 94

★★★★ **Radius LeMansGT, Radius, 408/434-1010, $2499.** Fast, 24-bit accelerated graphics card has automatic 30-bit CLUT calibration and can switch resolution on the fly via a pop-up menu. Oct 94

★★ **RasterOps Horizon 24, RasterOps, 408/562-4200, $1999.** This 13-inch 24-bit accelerated graphics card is slower than anticipated and overpriced. The ROM can, however, be upgraded via software. Oct 94

★★★ **Simply TV, E-Machines, 408/541-6100, $439.** Easy-to-install video card plugs snugly into a PDS slot, and allows you to use your Mac with a television for display. The image is impressively flicker-free, but the resolution is limited to 256 colors. Aug 94

★★★★ **SuperMac Spectrum Power•1152, SuperMac, 408/541-6100, $1399.** Fast, relatively cheap, 24-bit accelerated graphics card switches resolutions from the keyboard and has zoom and pan options. Oct 94

★★ **Tornado Graphics Card, Mirror Technologies, 612/832-5622, $699.** Inexpensive 24-bit accelerated graphics card has zoom and pan options but is relatively slow. Oct 94 m

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Streetwise Shopper

SPECIAL HARDWARE AND SOFTWARE BUYING OPPORTUNITIES

Selected and edited by Charles Barrett

The following listings include both time-sensitive promotions and open-ended offers being sponsored by Macintosh vendors and their resellers. Each listing indicates which products have been awarded a star rating in *Macworld's Reviews* (products rated ★★ or lower are not eligible for inclusion), have been selected as an **Editors' Choice**, or have won a **World-Class** award. In some cases, the editorial evaluation quoted is for an earlier product version. The ◐ symbol indicates that the product is Power Mac related. Except where otherwise indicated, prices given are suggested retail prices.

When placing an order, please mention that you saw the offer in *Macworld*. Should any problems arise, contact the *Streetwise Shopper* editor by fax (415/442-0766), phone (415/978-3241), or mail (*Macworld*, 501 Second St., San Francisco, CA 94107).

Vendors and resellers desiring to have products and services included in this section are encouraged to contact the *Streetwise Shopper* editor with particulars.

BUNDLES

BookEndz 500 + Monitor Stand Pilot Technologies is offering its $149 BE500 or $175 BE500E (includes Ethernet pass-through assembly) docking station for the PowerBook 520 and 540 series, plus a $64.95 monitor stand that allows a PowerBook to be used when stored inside the stand or pulled out on a sliding tray, for $189.95 or $214.95 (BE500E). Call 800/682-4987 to order. *Offer expires 1/31/95.*

◐ **ClarisWorks 3.0 + Claris Organizer 1.0** Claris Corporation is including a free copy of its $99 Claris Organizer (Jan 95 ★★★) personal information manager with the latest version of its $129 ClarisWorks integrated software application (Feb 95 ★★★★), which includes 75 clip art images and seven Monotype fonts. An upgrade bundle is available directly from Claris for $59 (unbundled $69 upgrades from resellers include a $30 rebate coupon). Call 800/325-2747 for more information. *Offer expires 1/31/95.*

◐ **Collage 2.0.1 +** ◐ **Adobe Photoshop 3.0** Specular International is offering its $349 Collage image-compositing software (Feb 95 ★★★) for $179 to customers who purchase it in conjunction with Adobe's $895 Photoshop image-editing program (Jan 95 ★★★★). Available through MacWarehouse (800/255-6227) and Mac's Place (800/905-0009). *Offer expires 1/31/95.*

◐ **Now Contact 3.0 + Now Up-to-Date 3.0** Now Software is offering a $79.95 bundle price (or $49.95 for each product separately) for its $69.95 contact manager (Mar 94 ★★★ for version 1.0) and $69.95 calendar program (Jun 93 ★★★★ for version 2.0). Once offer expires, bundle's selling price reverts to $99.95. Call 800/722-5963 for more information. *Offer expires 1/31/95.*

Mac 101e Keyboard + QuicKeys 3.0 Datadesk is offering CE Software's $169 QuicKeys keyboard shortcut utility (Mar 94 ★★★★) with its $159.95 Mac 101e extended keyboard for $149.95. The Mac 101e has 105 positive tactile-feedback keys and is available by itself for $99.95 (street price is regularly $129). Call 800/248-4001 for more information. *Offer expires 3/31/95.*

◐ **MediaFactory + MediaForce** Nuts Technologies is offering its entry-level $199 MediaFactory QuickTime editing program, plus its $379 MediaForce video digitizing NuBus card, for $429. Call 408/441-2166 for more information.

Phaser 540 + Phaser CopyStation Tektronix is including a $1695 color-copier component with its $8995 Phaser 540 continuous-tone color laser printer for $9995. Based on a 600-dpi Matsushita engine, the Phaser will print close to 4 CMYK or 14 monochrome pages per minute. Call 800/835-6100 for more information. *Offer expires 3/31/95.*

PrimeraPro Printer + Reli 4816T Scanner + ◐ **Adobe Photoshop 3.0** PixelExpress is offering Fargo Electronics' $1895 thermal-wax and dye-sublimation printer (Jan 95 ★★★) together with Relisys's $1299 4816T flatbed color scanner, Adobe's Photoshop image-editing program (Jan 95 ★★★★), and DPI's ArtScan Pro driver for $2295. Call 800/749-3966 to order and for more information.

Suite Imaging for Macintosh HSC Software is offering a bundle consisting of its $199 ◐ Kai's Power Tools 2.1, a collection of plug-in extensions (May 94 ★★★★★ for version 2.0a) for such applications as Adobe Photoshop and Fractal Design Painter, and its $199 ◐ KPT Bryce 1.0, a 3-D landscape-rendering program (Dec 94 ★★★★). Available for about $189.95 through ClubMac (800/258-2622), Mac's Place (800/905-0009), MacConnection (800/800-0002), MacWarehouse (800/225-6227), and The Mac Zone (800/248-0800). *Offer good until at least 1/15/95.*

VideoSpigot + MacRecorder Sound System Pro + Adobe Premiere 2.0LE TigerDirect is offering SuperMac Technology's $429 VideoSpigot (NuBus version) video-capture board and software (May 92 ★★★★), Macromedia's $349 MacRecorder Sound System Pro digital sound recorder hardware and SoundEdit Pro software, and a limited edition (does not include a four-color–separation capability) of Adobe Premiere 2.0 (Jan 93 ★★★★ for full version) for $199.90. Call 800/666-2562 to order (ask for part # H26-2000). *Offer good until at least 1/15/95.*

SIDEGRADES/UPGRADES

Adobe Streamline 3.0; ◐ **Adobe Dimensions 2.0** Adobe Systems is offering registered users of Adobe Illustrator 5.5 or Photoshop 3.0 its $199 tool for converting bitmapped images to PostScript line art and its $199, 3-D effects software (Apr 93 ★★★ for Dimensions initial release) for $99 each, or both for $149. Call 800/521-1976 to order. *Offer expires 3/31/95.*

FastPace Instant Contact 1.1 Foresight Technology is offering this $79.95 contact manager (Jan 95 ★★★ for version 1.0) for $29.95 to owners of any other contact manager who provide a copy of their manual cover or installation disk. Call 800/701-9393 for more information.

MasterJuggler 1.9 ALSoft is offering this $69.95 utility—which the company purports to be the only font manager that works with System 7.5 and QuickDraw GX and uses both TrueType and Type 1 GX fonts—to registered users of any other font manager for $29.95. Call 800/257-6381 for more information and to order.

SPECIAL DISCOUNTS/FREE OFFERS

◐ **Being There 2.0** Intelligence at Large is offering a $598 Basic Conferencing Starter Kit for $149 that includes video, audio, and collaborative tools for two users at a single site. The kit consists of two copies of its Being There corporate workgroup conferencing software, which boasts modem, ISDN, and TCP/IP network support, along with QuickTime 2.0 and a native video compressor-decompressor. Call 800/425-7638 for more information and to order.

Data Desk 4.2 NTL Data Description is offering full-time college students a complete version of its $595 data-analysis package, which is restricted only by its nontransferrable licensing, for $90. Data Desk combines traditional stastistical functions with dynamic data display and manipulation, and it includes a full range of statistical plots and procedures. Free demo disk available. Call 607/257-1000 for more information.

Fugix Photo Video Imager FV-7 Digital Vision is offering this $999.95 Fuji video camera, which can also be used to grab images from slides and photo negatives, for $799.95. Sample images captured with DV's ComputerEyes SCSI video frame-grabber and the FV-7 can be downloaded from DV's technical support BBS at 617/329-8387 (up to 14.4 Kbps). Call 617/329-5400 for more information.

LabelWriter XL Plus + FileMaker Pro 2.1 CoStar Corporation is offering a Database Value Pack that combines its $299.95 laser-quality, 203-dpi thermal printer with Claris Corporation's $399 database program (Jan 93 ★★★★ for FileMaker Pro 2.0); a set of templates that turns FileMaker into a contact manager; plus over 1000 shipping, disk, and address labels. Available through resellers for under $400. Call 800/426-7827 for more information.

PageMaker 5.0 Enhancement Pack Volume 1 for Macintosh Adobe Systems is offering a free group of utilities and filters, including the QuarkXPress Converter for PageMaker 5.0, which translates QuarkXPress files into PageMaker format; an import filter for ClarisWorks 1.0 or 2.0; a TWAIN import filter for saving TIFFs into PageMaker; and a filter for importing WordPerfect 6.0 DOS/Windows files into PageMaker for the Macintosh. Available free on CompuServe and America Online; or on disk for $9.95 from the Aldus Technical Support BBS at 206/623-6984. For more information, call 800/628-2320. m

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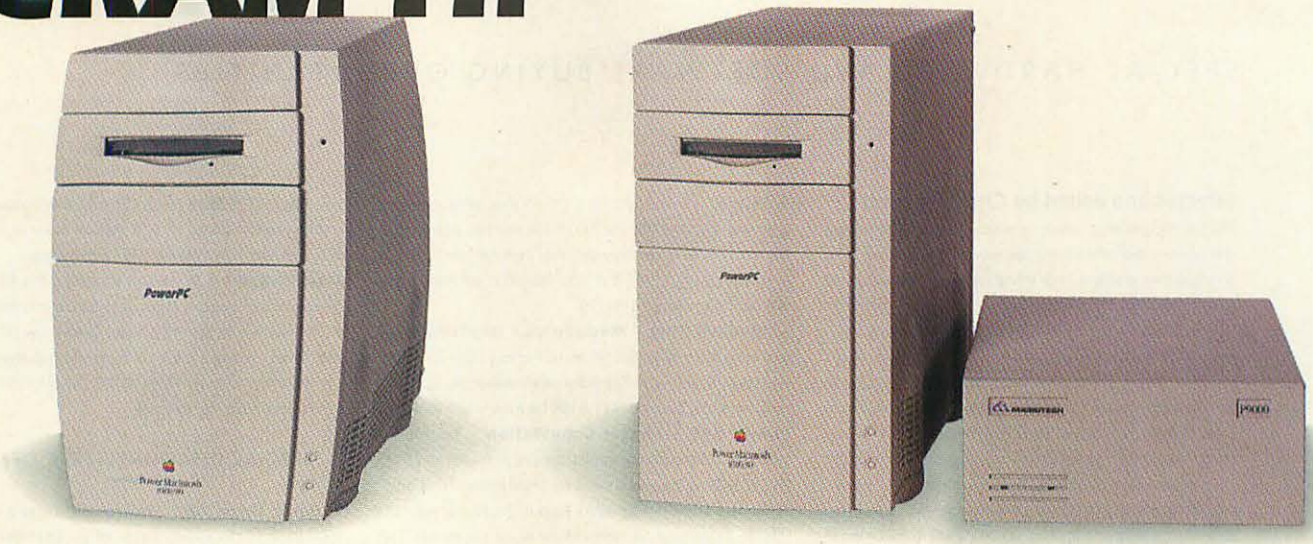

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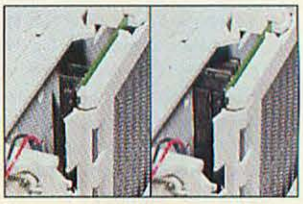

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Macworld Advertiser Index

Say you saw it in Macworld. To purchase products advertised in this issue call the phone numbers below or use the reader service number for our FastFacts Product Information Card located after the product index.

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Please answer these questions so that we may better serve you.

A. Including yourself, approximately how many people are employed at your entire work-site (i.e., employees in your office, building, or cluster of buildings)? (Check one.)

01 ❑ 1000+
02 ❑ 999 - 100
03 ❑ 99 - 25
04 ❑ Under 25

B. Which of the following computers are installed at this entire work-site? (Check all that apply.)

05 ❑ Apple Workgroup Servers/ Mac Quadra-series
06 ❑ Mac Centris-series/II-series/LC III/ Performa 600/450/SE 30
07 ❑ Mac LC/LC II/Performa 430/405/ 400/200/Classic-series/SE/Plus/ 512K/128K/Portable
08 ❑ Mac PowerBook-series/Duo-series

C. What is the total number of Macs installed at this entire work-site? (Check one.)

D. For how many Macintosh computers within this entire work-site do you have purchase involvement for products and/ or services? (Check one.)

	C	D
500+	❑ 09	❑ 15
499 - 100	❑ 10	❑ 16
99 - 50	❑ 11	❑ 17
49 - 10	❑ 12	❑ 18
9 - 1	❑ 13	❑ 19
None	❑ 14	❑ 20

E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work-site? (Check all that apply.)

21 ❑ Initiate/Determine need for product/capabilities/features
22 ❑ Evaluate, recommend, or approve brands/models
23 ❑ Evaluate, recommend, or approve purchase source
24 ❑ Authorize purchases

F. Over the next 12 months, how much will this entire work-site spend on Macintosh products and/or services? (Check one.)

25 ❑ $1 million or more
26 ❑ $999,999 – $500,000
27 ❑ $499,999 – $100,000
28 ❑ $99,999 – $50,000
29 ❑ $49,999 – $10,000
30 ❑ Under $10,000

G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)

31 ❑ Business software (Word processing, spreadsheet, database, etc.)
32 ❑ Graphics/publishing software
33 ❑ Monitors/displays
34 ❑ Printers/scanners
35 ❑ Networking/communications hardware and/or software
36 ❑ Multimedia/AV hardware and/or software
37 ❑ Mobile computing products (PowerBooks, peripherals, software, etc.)

H. What is your primary job function? (Check one.)

38 ❑ Computer Reseller/VAR/VAD
39 ❑ MIS/DP/IS/Network Management
40 ❑ Engineering
41 ❑ R&D/Scientific
42 ❑ Corporate/General Management
43 ❑ Accounting/Finance
44 ❑ Marketing/Sales/PR/ Communications
45 ❑ Art/Design/Creative Services

Thank You!

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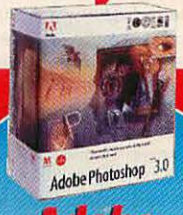

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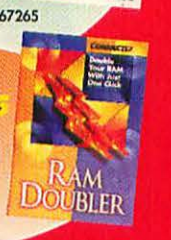

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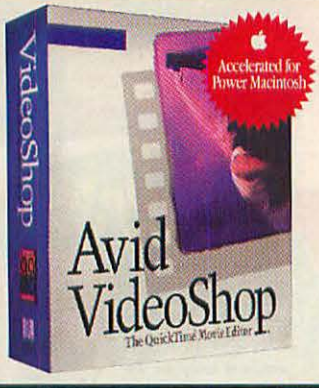

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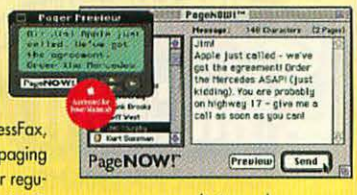

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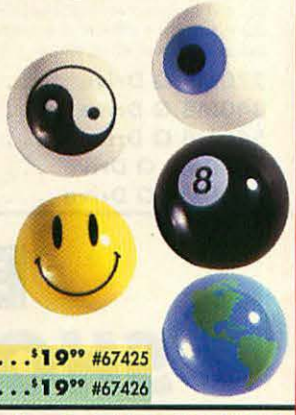

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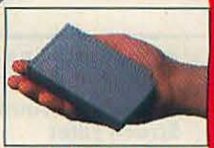

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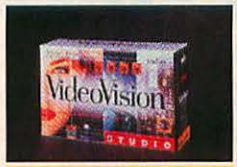

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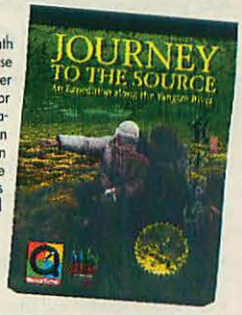

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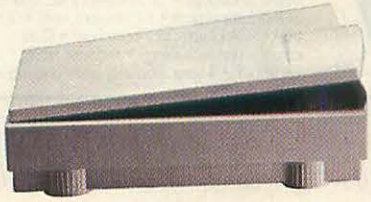

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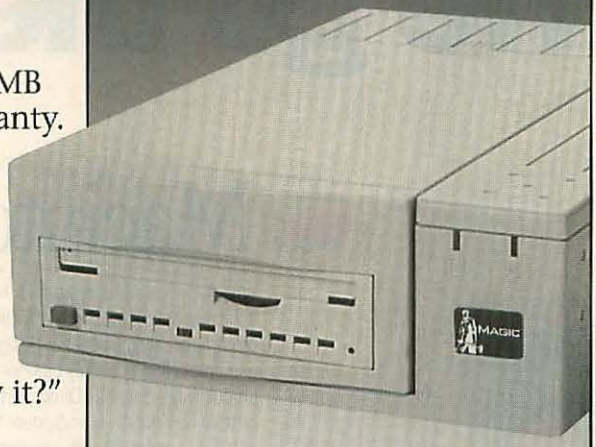

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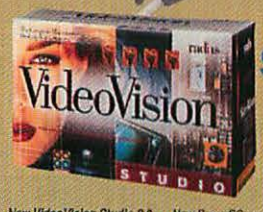

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Capacity	Access	Internal	External
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514MB	17ms	$449	$569

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The Quantum Lightning 3.5-inch hard disk drives, are high-performance, high-capacity devices built on a solid foundation of proven technology. These drives are designed for business, technical, and multimedia application.

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Value/Entry Level (MAVERICK)			
3.5" Low Profile			
270MB	14ms	$189	$249

EMPIRE Series

High Performance/Capacity (EMPIRE)			
3.5" Low Profile			
1080MB	9.5ms	$599	$659
1440MB	9.5ms	$769	$829
3.5" Half Height			
2160MB	9.5ms	$1039	$1099
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3.5" Half Height			
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ACTIVE TERMINATION

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ACTIVE TERMINATION

	Internal	External
5.25" ClubMac 88MB	$328	$368

Seagate

$1239 Barracuda 2 Internal*

FIVE Year Warranty

30 DAY

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
3.5" Half Height						
2.4GB	ST12400N	*Hawk 2*	9ms	2000MB	$1099	$1159
4.3GB	ST15230N	*Hawk 4*	9ms	4000MB	$2019	$2079
1.7GB	ST11950N	*Barracuda 1*	8ms	1350MB	$1289	$1349
2.5GB	ST12550N	*Barracuda 2*	8ms	2050MB	$1239	$1299
4.3GB	ST15150N	*Barracuda 4*	8.5ms	4000MB	$2469	$2529
5.25" Full Height						
3.4GB	ST43400N	*Elite-3*	11ms	2750MB	$2089	$2189
9.1GB	ST410800N	*Elite-9*	11ms	8600MB	$3769	$3869

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- 3,000 RPM rotational speed
- 80,000 hours MTBF

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ACTIVE TERMINATION

Optical Drive	Size/Model	Seek Time	Internal	External
ClubMac 230MB	3.5" Olympus	28ms	$865	$895
ClubMac 1.3GB	5.25" Sharp	39ms	$1969	$1999
MaxOptix Tahiti III 1.3GB	5.25" 1.3GB	19ms		$2499

ClubMac Opticals include ONE cartridge, 30-Day Money Back Guarantee and a ONE Year Warranty (Olympus Optical includes a TWO Year Warranty.)

OPTICAL MEDIA						
	3.5" 128MB	$29	5.25" 594MB	$79	5.25" 1.2GB	$99
	3.5" 230MB	$39	5.25" 652MB	$79	5.25" 1.3GB	$99

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ClubMac 2X CD-ROM

- Dual Speed CD-ROM Reader
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- 300KB/sec data transfer rate
- 64K data buffer

30 DAY

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			with ClubMac CD bundle
ClubMac **Dual**-Speed	320ms access time, 300KB/sec transfer rate	$199	$299
ClubMac **Quad**-Speed	220ms access time, 600KB/sec transfer rate	$439	$539
NEC MultiSpin 2V	(available in gray) 320ms access time, 300KB/sec transfer rate	$249	$349
NEC MultiSpin 3Xp Plus	240ms access time, 500KB/sec transfer rate	$399	$499
NEC MultiSpin 4Xe	220ms access time, 600KB/sec transfer rate	$499	$599

NEC MultiSpin CD-ROM Readers carry a TWO Year Warranty.
ClubMac CD-ROM Readers carry a 30-Day Money Back Guarantee and a ONE Year Warranty

ClubMac TAPE BACKUP Drives

ClubMac 2.0GB DDS DAT Drive

30 DAY

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- Up to 266 KB/sec data transfer rate
- SCSI-1/SCSI-2 interface
- 60,000 hours MTBF
- Includes Switchable Active Termination, TWO Year Warranty, Retrospect BackUp Software, and ONE 90m tape cassette

ACTIVE TERMINATION

Capacity	Model	Format	Media	Internal	External
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4.0GB	ClubMac DAT/2	DDS-2	60m, 90m, 120m	$869	$919
4-8GB	ClubMac DAT/2DC	DDS-2DC	60m, 90m, 120m	$949	$999

MEDIA	4mm 60m $10	4mm 90m $12	4mm 120m $25	Exabyte EX-HC2000 $35

ClubMac DAT and DAT/DC drives include Retrospect v2.1 Backup Software, ONE 90 Meter Tape and a TWO Year Warranty. Exabyte Tape Backup drives carry a ONE Year Warranty. The ClubMac DAT/2 drive includes Retrospect v2.1 Backup Software, ONE 120 Meter Tape and a ONE Year Warranty

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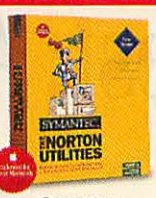

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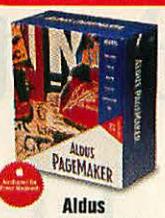

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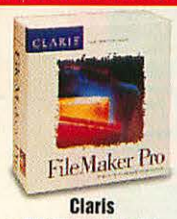

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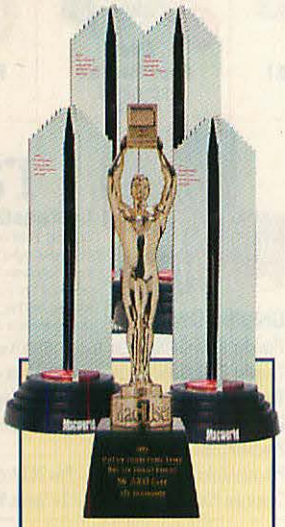

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Solves Bus Impedance Issues	✓
LED Activity Indicators Diagnostic Tool	✓
Easy Installation: Takes Seconds	✓

Don't be confused by inferior knock-offs. Only APS SCSI Sentry gives you all these features.

Bigger Drive! Bigger Value!

Get the APS Q 730 internal for only $329.95! The APS Q 730 is an outstanding performer that gives all the exacting specifications of the APS Q 540 plus the added bonus of more Megs for your money! Featuring the industry's first two-platter 730 MB drive. This is a great drive for any user.

APS Q 730

$329.95*

APS HARD DRIVES

For your Mac or Power Mac

Model	Capacity	Internal	SR2000
258MB - 2006MB			
APS Q 270[2] Quantum Maverick 270	258MB	$179.95	$279.95
APS Q 540[2] Quantum Maverick 540	516MB	269.95	369.95
APS Q 730[2] Quantum Lightning 730	731MB	329.95	429.95
APS ST 1.0[5] Seagate ST 12550N Barracuda	1010MB	599.95	699.95
APS D 1.0[5] DSP 3107 mechanism	1020MB	699.95	799.95
APS Q 1080[2] Quantum 1080S mechanism	1029MB	599.95	699.95
APS Q 2.0[5] Quantum 2160 Mechanism	2006MB	1099.95	1199.95
2040MB - 8673MB			
APS ST 2.0[5] Seagate ST 12550N Barracuda	2040MB	$1299.95	$1399.95
APS D 2.0[5] DSP 3210 Mechanism	2047MB	1199.95	$1299.95
APS MS 4.0[5] Micropolis 3243 mechanism	4075MB	2299.95	2399.95
APS MS 4.0AV[5] Micropolis 3243AV mechanism	4075MB	2399.95	2499.95
APS ST 4.0[5] Seagate ST 15150 mechanism	4294MB	2499.95	2599.95
APS MS 9.0[5] Micropolis 1991 mechanism	8500MB	3399.95*	3599.95*
APS MS 9.0AV[5] Micropolis 1991AV mechanism	8500MB	3499.95*	3699.95*
APS ST 9.0[5] Seagate ST410800N mechanism	8673MB	3799.95*	3999.95*

Internal drives for Quadra 800 and Centris 610 available
DATerm™ patent pending
Copyright © 1994 APS Technologies
1-5 Denotes length of manufacturer's warranty
** Internal Price Listing*
** External Case is Special Full Height Only*
Full Height cases include SCSI Sentry FREE!

NEW FROM APS

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ARRAID Disk Array from APS Power-Performance-Reliability

Model	Capacity	RAID Stripe	Price
APS ARRAID			
ARRAID S2/5400[5]	2GB	Striped	$1599.95
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ARRAID S4/7200[5]	4GB	Striped	3299.95
ARRAID M1/5400[5]	1GB	Mirrored	1599.95

ARRAID: Disk Array systems from APS are high performance, easy-to-use Disk Array storage solutions. ARRAID provides the Power, Reliability and plug-and-play convenience Macintosh users expect. Available in mirrored or striped configurations up to 16GB, with a 5year warranty.

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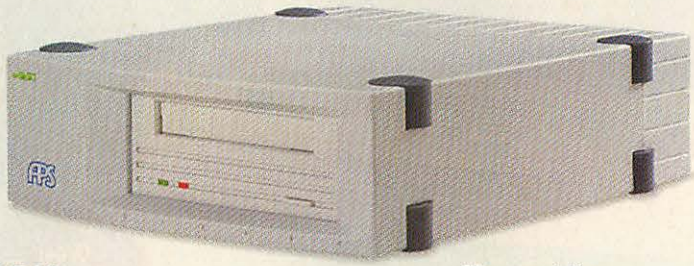
APS HyperDAT™ $999

External configuration



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If you need high-speed backup (not the kind that ties your server up and slows down your network), you need the DDS-2 power of the APS HyperDAT! Back up locally at rates as high as 28MB per minute! Pack up to 10GB on a single tape! Best of all, your regular DDS and DDS compression tapes can be read in the APS HyperDAT, too!

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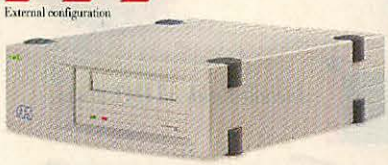
The amazing APS DAT offers you great performance and reliability. Get up to 2.0GB on a 90 meter tape with backup speeds as high as 10MB per minute.

All APS DATs Include Retrospect by Dantz, & 1 Tape Free!

APS DAT $799.95

External configuration



Macworld's 1994 World-Class Award for Alternative Storage goes to the APS line of DAT Drives.

DAT

Model	Capacity*	Internal	SR 2000
APS DAT[2]	1.8-2G on 90m	$749.95	$799.95
APS HyperDAT[1]	8-10G on 120m	949.95	999.95

*Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.

Maxell DAT Tapes	*1-4*	*5-19*	*20+*
60-Meter	$9.95	$8.95	$7.95
90-Meter	11.95	10.95	9.95
120-Meter (DDS-2)	22.95	21.95	20.95

3M DAT Tapes	*1-4*	*5-19*	*20+*
60-Meter	$9.95	$9.50	$8.50
90-Meter	11.95	11.50	10.50

APS T3501 $299.95

QUAD SPEED CD ROM!

External configuration

SYQUEST

Model		SR 2000
APS SQ 5110c2	44/88MB†	$399.95
APS SQ 52002	200MB††	499.95
APS SQ 31051	105MB	329.95
APS SQ 32701	270MB	499.95

† Does not format 44MB cartridges
†† Does not format 44MB & 88MB cartridges
All SyQuest Drives Include 1 FREE Cartridge

SyQuest Media	*1-4*	*5-19*	*20+*
SQ-400 (44MB) cartridge	$59.95	$58.95	$57.95
IO-44 (44MB) cartridge**	49.95	48.95	47.95
SQ-800 (88MB) cartridge	79.95	78.95	77.95
IO-88 (88MB) cartridge**	69.95	68.95	67.95
SQ-2000 (200MB) cartridge	89.95	87.95	86.95
SQ-310 (105MB) cartridge	59.95	57.95	56.95
SQ-327 (270MB) cartridge	69.95	68.95	67.95

Prices listed are for unformatted media.
** Indicates SyQuest compatible cartridges

Same day shipping for personal checks (Restrictions apply)

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Visa, Master Card, Discover, American Express: No Surcharge.

MAGNETO OPTICAL

Model	Internal*	SR 2000
APS 230MB MO[1]	$799.95	$899.95
APS 1.3Gig MO[1]	1899.95	1999.95

All MO Drives Include 1 FREE Cartridge

MO Media (unformatted)	*1-4*	*5-19*	*20+*
128MB cartridge —	$35.95	$34.95	$29.95
230MB cartridge —	45.95	44.95	39.95
1.3Gig cartridge —	109.95	109.95	104.95 (1024KB/s)

CD ROM

Model	Price
APS T3501 (in SR 2000) QUAD SPEED!	$299.95
APS T3501 (Internal) QUAD SPEED!	$279.95

POWERBOOK DRIVES

Model	Capacity	Internal	LW Pro 630	Companion II
APS T 340[1]	324MB	399.95	449.95	549.95
APS Q 341[1]	320MB	349.95	399.95	499.95
APS Q 514[1]	490MB	449.95	499.95	599.95
APS T 520[1]	500MB	499.95	549.95	649.95

POWERBOOK STUFF

APS SCSI DOC w/ PowerMerge Lite $39.95

Palm-Sized 25–30 PowerBook SCSI Adapter that includes a docking adapter for PowerBook and termination power indicator. Receive Power-Merge Lite Free with every APS SCSI DOC!

APS SCSI BOY $19.95

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- 30-day money-back guarantee • (Excluding opened software) Your risk is the cost of shipping.
- Drive-for-Drive Repair or Replacement Warranty • The warranty length is denoted by the superscripted number next to each drive model. APS will, at its discretion, replace or repair products found to be defective according to the terms of the product's warranty.
- All prices and specifications are subject to change without notice.
- Refused orders subject to restocking fee.
- Hard drives include brackets, cables, cords and LEDs required for operation with the specified Macintosh: where applicable. All hard drives from APS Technologies come preformatted with Apple's System 7.0.1 software, and APS Technologies' APS POWER TOOLS SCSI formatter/hard disk partitioner.
- All external drive products and cases come with a premium 25 x 50 SCSI cable. Companion II drives (not cases) include a 18x50 SCSI cable with SCSI BOY.
- International customers must pay for all shipping charges.
- Toll-free technical support is needed. Regular hours are 8 am to 8 pm Monday thru Friday, 9 am to 1 pm Saturday, Central Time.

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APS Technologies

Circle 62 on reader service card

Unsurpassed removable drive reliability and performance.

MacUser RATED 4½ OCTOBER 1994

The Spin 1021: "The fastest drive... a killer."

1GB-1.6GB category

Bernoulli Drives

Based on the new Bernoulli mechanism, Spin's 230MB cartridge drive continues the Bernoulli tradition of rugged dependability while creating a new performance standard for cartridge drives. With a five year warranty on drives and cartridges, the 230MB drive features DCR Active Termination for increased reliability and backward compatibility with older Bernoulli cartridges.

Bernoulli 230MB $399 Cartridge $89

Order Bernoulli Media Overnight!

Welcome to Spin Peripherals.

Spin supplies the best drives available so your business moves faster than the world around you. We deliver the speed and dependability you need, and our exceptional customer service team will be there when it seems the world is about to catch up. But don't worry, it won't.

Included with all DAT drives.

DAT Drives

Before disaster strikes, secure you valuable data with a Spin DAT drive. The low cost 3100 stores 2GB while the 3400 packs up to 8GB for remote backups and large audio, video and graphics files. All DAT drives include one tape cartridge and Retrospect™ for easy, complete backups.

Spin 3100 (DDS)	**$799**
Spin 3200 (DDS-DC)	**$979**
Spin 3400 (DDS-2)	**$999**

Optical Drives

Using laser and magnetic technology, Spin MO drives keep your valuable data secure. Spin's 3.5" Olympus 230MB and 5.25" NEC 1.3GB optical drives set the standard for speed and capacity. Great for backups, archiving, and as a secondary drive. One cartridge included.

Olympus 230MB	**$899**	**Cartridge $39**
NEC 1.3GB	**$1999**	**Cartridge $85**
Maxoptix T3 1.3GB	**$2739**	**Cartridge $85**

Spin CD-ROM Drives

Spin's 2x and 4x Multisession CD-ROM drives deliver the excitement of multimedia to your desktop. Enhance either drive with Spin's CD-ROM bundle, including speakers, headphones, CD-ROM titles and more!

Spin 2x Drive with Bundle	**$299**
Spin 2x CD-ROM Drive	**$199**
Spin 4x Drive with Bundle	**$499**
Spin 4x CD-ROM Drive	**$399**

SmartTerm

The latest in Macintosh termination technology, SmartTerm's DCR Active Termination ensures data integrity and maximizes SCSI performance. Online status indicators monitor activity and isolate system freezes, while gold connectors provide excellent conductivity. SmartTerm is a smart investment for any Macintosh user.

SmartTerm Active Terminator $65

PowerBook Drives

Spin 2.5" drives are fast, easy to install, and offer the capacity you need when you are on the road.

Quantum 127MB	**$219**
Quantum 170MB	**$279**
Quantum 256MB	**$299**
Quantum 341MB	**$359**
Quantum 514MB	**$469**

✈ $5.00 OVERNIGHT SHIPPING! ✈

Spin will ship any order to you overnight for just $1.00 per pound, with a $5.00 minimum. If your order is over 21 pounds

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MacUser RATED ★★★★½ OCTOBER 1994

The Spin 2149: "The second fastest drive... and costs less."

1.7GB-2.8GB category

Multimedia Bundles

Multimedia Entertainment! Our 2x CD-ROM drive offers the most affordable solution, while our new 4x races by older drives. Both are Multisession and include DCR Active Termination, stereo RCA jacks, and Red Line! CD software for increased speed. The Bundle contains speakers, headphones, Grolier's Encyclopedia, Oceans Below, and more!

Spin 2x Drive with Bundle	$299
Spin 4x Drive with Bundle	$499

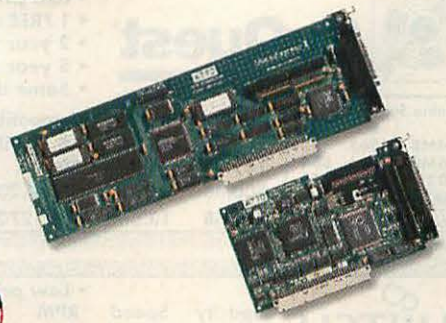
Includes Red Line! CD software, featuring state-of-the-art caching technology!

Complete multimedia systems as low as $299!

Hard Drives

Our external Tornado drives boast a 40 watt power supply, DCR Active Termination, a front mounted power switch, and interlocking feet for stable stacking. Internal drives take minutes to install. Drives over 1GB include RAIDLine! striping/mirroring software.

CAPACITY	INTERNAL	EXTERNAL
Spin 1021 1.0GB	$699	$799
Spin 2149 2.1GB	$1199	$1299
Quantum 365MB	$209	$309
Quantum 540 MB	$269	$369
Quantum 730MB	$329	$429
Quantum1.08GB	$599	$699
Quantum 1.4GB	$859	$959
Quantum 2.1GB	$1199	$1299
Seagate 2.0GB	$1399	$1499



ATTO Boards

Video, prepress and other storage-intensive applications benefit substantially from these SCSI-2 BusMaster accelerators that parallel process with the Mac's CPU. The FAST Silicon Express II accelerates throughput by up to 800%, while the FAST/WIDE Silicon Express IV uses RISC technology to attain a 1400% increase.

SE II with RAIDLine!	$795
SE II with Drive Purchase	$649
SE IV with RAIDLine!	$1295
SE IV with Drive Purchase	$1049

SyQuest Drives

Spin SyQuest™ 3.5" and 5.25" removable drives accommodate your expanding storage needs without slowing you down. The new 200MB and 270MB continue the SyQuest reputation for convenience and reliability at higher speed and capacity. Small, lightweight cartridges are easy to transport and store.

SyQuest 44MB	$199	Cartridge	$55
SyQuest 44/88MB	$299	Cartridge	$69
SyQuest 200MB	$409	Cartridge	$79
SyQuest105MB	$279	Cartridge	$56
SyQuest 270MB	$429	Cartridge	$65

Accelerated SCSI-2 Performance!

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Free with hard drives over 1GB! RAIDLine! doubles your throughput, writing to 2 drives simultaneously. Striping (RAID Level 0) provides unparalleled speed for all applications, including digital video and Photoshop™. Mirroring (RAID Level 1) is perfect for server applications, creating redundant disks automatically so that your valuable data is always safe.

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- Friendly, helpful staff. We appreciate your business!

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#1 HARD DRIVE FOR MAC!

1080MB Internal $550 External $599

MegaHaus is your #1 source for Quantum drives.
- Low price guarantee on all Quantum drives!
- Same day shipping on most orders!

Capacity	Speed	RPM	Buffer	Wty	Model	Internal	External
170MB	17ms	3600	32K	2yr	ELS170S	$169	$229
270MB	12ms	4500	128K	2yr	LPS270S	$188	$248
340MB	12ms	4500	128K	2yr	LPS340S	$209	$269
365MB	11ms	4500	128K	2yr	LT365S	$219	$279
540MB	14ms	3600	128K	2yr	MV540S	$248	$308
541MB	11ms	4500	128K	2yr	LT540S	$254	$314
731MB	11ms	4500	128K	2yr	LT730S	$312	$372
1080MB	9.5ms	5400	512K	5yr	EMP1080S	$550	$599 BEST BUY!
1440MB	9.5ms	5400	512K	5yr	EMP1440S	$715	$775
2140MB	8.6ms	7200	512K	5yr	GP2140S	$1269	$1369
2160MB	9.5ms	5400	512K	5yr	EMP2160S	$959	$1019
4280MB	8.6ms	7200	512K	5yr	GP4280S	$2399	$2499

SyQuest®

MegaHaus is your #1 source for Syquest drives.
- Low price guarantee on all Syquest drives!
- 1 FREE cartridge with each drive!
- 2 year warranty on drive and case!
- 5 year warranty on all cartridges!
- Same day shipping on most orders!

Genuine Syquest Media	5-9	10+
44MB	$61	$57
88MB	$66	$64
105MB	$54	$53
200MB	$77	$75
270MB	$62	$59

Capacity	Speed	Compatible	Model	Buffer	Internal	External
88MB	20ms	44, 88MB	SQ5110C	32K	$305	$359
105MB	14.5ms	105MB	SQ3105S	64K	$259	$309
200MB	18ms	44,88,200MB	SQ5200C	64K	$429	$485
270MB	13.5ms	105, 270MB	SQ3270S	128K	$419	$480

MICROPOLIS

5 Yr warranty. Add $90 for External.

INCREDIBLE NEW DRIVES

•7200rpm •8.5ms

2050MB MC4221 $1189

4294MB MC3243 $2059

Size	Speed	RPM	Model	Internal
3020MB	11ms	5400	MC1936	$1539
9100MB	12ms	5400	MC1991	$3339
Audio / Visual Drives				
2050MB	8.5ms	7200	MC4221AV	$1279
3020MB	11ms	5400	MC1936AV	$1599
4294MB	8.5ms	7200	MC3243AV	$2159
9100MB	12ms	5400	MC1991AV	$3429

FUJITSU

- Low price guarantee on all Fujitsu drives!

Capacity	Speed	RPM	Buffer	Wty	Model	Internal	External
530MB	13.8ms	4500	256K	2yr	M2684S	$230	$280
1080MB	9.5ms	5400	256K	5yr	M2694S	$509	$569 BEST BUY!

HARD DRIVES

Capacity	Speed	RPM	Buffer	Brand	Warranty	Internal	External
720MB	12ms	4500	192K	IBM	2 Years	$355	$415
2040MB	9.2ms	5400	512K	IBM	5 Years	$1099	$1159
2145MB	8ms	7200	1024K	Seagate	5 Years	$1125	$1225
2148MB	9ms	5400	512K	Seagate	5 Years	$999	$1059
4250MB	11ms	5400	1024K	IBM	5 Years	$2089	$2189
4290MB	8ms	7200	1024K	Seagate	5 Years	$2299	$2399
9080MB	11ms	5400	1024K	Seagate	5 Years	$3399	$3499

Many others available. Includes 4.3 compatible software driver & cables. We stock multiple bay enclosures for custom configurations.

CD ROM DRIVES

Brand	Model	Speed	Transfer	Buffer		Internal	External
Sanyo	SH93R	280ms	330KB/sec	256K		$149	$209
Teac	CD55	165ms	600KB/sec	256K		$309	$369
Toshiba	XM3501	120ms	600KB/sec	256K		$329	$389 BEST BUY!
Pioneer	DRM602X	300ms	307KB/sec	256K	6 Disc CD Changer		$489
Pioneer	DRM604X	300ms	612KB/sec	256K	6 Disc CD Changer		$1029
Pionner	DRM1804X	300ms	612KB/sec	256K	18 Disc CD Changer		$1979

Includes driver software with music play, $25 Photo CD processing coupon, and cables. Multi Drive CD Towers in stock

TAPE DRIVES

Capacity	Type	Brand	External	Capacity	Type	Brand	External
250MB	QIC 150	Archive	$499	4-8Gig	DDS DAT	Conner	$999
.75-1.5Gig	MiniCart	Exabyte	$649	4-8Gig	DDS DAT	HP	$1049
2-4Gig	MiniCart	Conner	$719 BEST BUY!	4-10Gig	DDS2 DAT	Conner	$1129
2Gig	DAT	HP	$859	4-10Gig	DDS2 DAT	HP	$1259
2Gig	DAT	Conner	$959	20&40Gig	DLT	Quantum	$Call

Includes Retrospect 2.1, 1 tape, and cables. OPTIMA DeskTape Software mounts DAT on desktop $275.

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Power HD™

- Drives from 270MB to 4Gig that are specifically configured for *Power Mac* operation.
- Includes *Power Mac* Native Hard Disk ToolKit software.
- NOW AVAILABLE! New 6100 ZFP model features a case that fits perfectly under your *Power Mac 6100*. Holds up to 4 drives.
- Call for up to the minute pricing.

OPTICAL DRIVE SALE!

- Includes cables, and 1 free disk.
- Smart Storage Solutions drives feature toll free support & mechanism made by IBM.
- Media price is for 10+ or w/ drive purchase.

Capacity	Brand	External	Media
128MB	Smart Storage	$689	$27
230MB	Smart Storage	$849	$36
230MB	Fujitsu	$879	$36
1.3Gig	Smart Storage	$1969	$84
1.3Gig	Hewlett Packard	$2229	$84
1.3Gig	Maxoptix	$2339	$84

2.5" Powerbook Drives

Size	Speed	RPM	Brand	Price
240MB	14ms	4500	Fujitsu	$270
256MB	17ms	4500	Quantum	$272
514MB	17ms	4500	Quantum	$435

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UNBELIEVABLE!! CONNOR 2.1GIG

FUJITSU — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	INTERNAL	EXTERNAL
530MB**	3.5"	13MS	$ 379	$ 439
1.2GIG	3.5"	8.5MS	$ 595	$ 655

Seagate — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	MODEL	EXTERNAL
1.2GIG	3.5"	9MS	ST31200N	$ 675
2.5GIG	3.5"	8MS	Barracuda 2	$ 1295
2.5GIG	3.5"	8MS	Barracuda 2 WIDE	$ 1499
2.4GIG	3.5"	9MS	ST12450W	$ 1749
3.4GIG	5.25"	10MS	Elite 3	$ 1999
4.1GIG	3.5"	8MS	BARRACUDA 4	$ 2335
9.0GIG	5.25"	11MS	Elite 9	$ 3995

CONNER — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	MODEL	EXTERNAL
330MB**	3.5"	12MS	CFA340S	$ 275
545MB**	3.5"	12MS	CFA540S	$ 450
1.0GIG	3.5"	9MS	CFP1060S	$ 635
2.1GIG	3.5"	9MS	CFP2105S	$ 995
4.2GIG	3.5"	9MS	CFP4207S	$ 2195

Quantum — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	MODEL	EXTERNAL
1.0GIG	3.5"	9MS	E1080S	$ 645
2.2GIG	3.5"	9.5MS	E2160S	$ 1099
4.3GIG	3.5"	9MS	4280S	$ 2295

POWERBOOKS

240MB	14MS	$315	$415
340MB	14MS	$385	$485
514MB	14MS	$445	$545

DATASONIX PEREOS
A Mobile storage Product Runs on 2 AA Batteries for 4 months. 10mb/min. 2.37" x 4" x 1.87" Shipping DOS version.

CD ROMS

TEAC CD-50	$ 275
Toshiba 4101	$ 285
Toshiba 3501 4 Speed	$ 445
Yamaha 4 speed recorder	$ 4995
Ricoh 1000 CD-Recorder	$ 2395

1.2MB Buffer so you won't get data transfer interruptions (Thats double the buffer size of the Pinnacle Micro). And 680MB media for only $15.99. Just set the recording format, select the files, and hit create.

MONITORS

Sony GDM-15SF1 15" $469
Flat anti-glare coated supports every PC and Mac resolution ie. 1280 x1024

TRINITRON MONITORS
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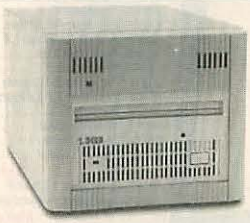

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230MB	IBM		30MS		$ 849
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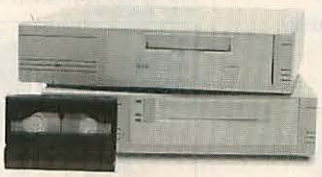

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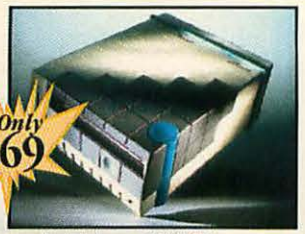

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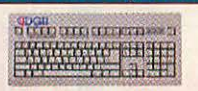

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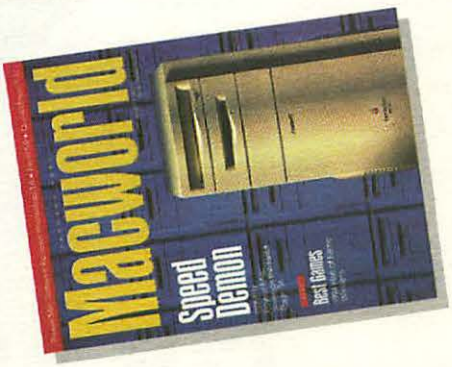

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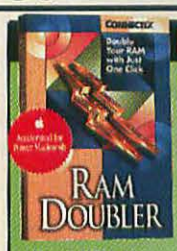

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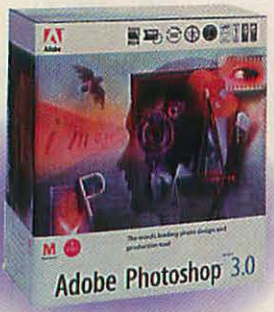

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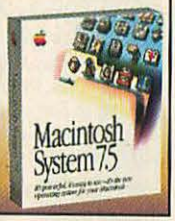

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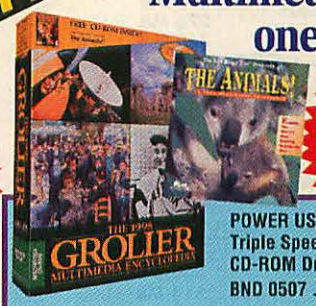

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IDE Drives

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NEC

Capacity	Model	Size	Access	Price
345MB	D3713	3.5"	12ms	$185
540MB	D3717	3.5"	12ms	$260

NEC drives include a 2 year warranty

MICROPOLIS

1.2GB	2210	3.5"	10ms	$575
1.7GB	2217	3.5"	10ms	$895

Micropolis drives include a 5 year(Advance Replacement)warranty

Seagate

214 MB	ST3243	3.5"	15ms	$165
260 MB	ST3290A	3.5"	15ms	$180
340 MB	ST3391A	3.5"	12ms	$205
420 MB	ST3491A	3.5"	12ms	$225
540 MB	ST5660A	3.5"	12ms	$295

Seagate drives include a 2 year warranty

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Zero Footprint	$75
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Multi Bay Cabinets	$CALL

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Hard Drives

New Pricing

Quantum Quantum Quantum

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Quantum

Quantum hard drives are based on customer focused innovation, making Quantum a leading manufacturer of 2.5 inch and 3.5 inch high quality, high performance hard disk drives.

Capacity	Access	RPM	Cache	Int.	Ext.
170 MB	11 ms	4500	128K	$165	$225
270 MB	11 ms	4500	128K	185	245
365 MB	11 ms	4500	128K	215	275
540 MB	14 ms	4500	128K	245	305
730 MB	11 ms	4500	512K	340	400
1080MB	10 ms	5400	512K	595	655
1440 MB	9.5 ms	5400	512K	730	790
2100 MB	9.5 ms	5400	512K	1025	1085
4200 MB	8.6 ms	7200	512K	Call	Call

Daytona Series Powerbook Drives

Capacity	Seek	Warranty	Int.	Ext.
256 MB	17ms	1 Year	280	380
514 MB	14ms	1 Year	465	565

MICROPOLIS MICROPOLIS

Capacity	Size	Model	Access	RPM	Cache	Int.	Ext.
1.2 GB	3.5"	M4110	8 ms	5400	512K	$575	$635
1.7 GB	3.5"	M2217	10 ms	5400	512K	895	955
2.1 GB	3.5"	M4200	8.5 ms	7200	512K	Call	Call
3.6 GB	5.25"	M1936	11 ms	5400	256K	1750	1850
4.3 GB	3.5"	M3243	8.5 ms	7200	512K	2345	2405
9.0 GB	5.25"	M1991	12 ms	5400	512K	3450	3550

Direct to Disk Recording AV Drives

1.2 GB	3.5"	M4110AV	10 ms	5400	512K	$625	$685
1.7 GB	3.5"	M2217AV	10 ms	5400	512K	945	1005
3.6 GB	5.25"	M1936AV	11 ms	5400	512K	1925	2025
4.3 GB	3.5"	M3243AV	8.5 ms	7200	512K	2395	2455
9.0 GB	5.25"	M1991AV	12 ms	5400	512K	3500	3600

Seagate Seagate Seagate Seagate

Capacity	Size	Model	Access	RPM	Cache	Int	Ext
1.2 GB	3.5"	ST31200N	10ms	5400	256K	$595	$655
1.9 GB	3.5"	Hawk 2	9ms	5400	512K	1195	1255
4.2 GB	3.5"	Hawk 4	9ms	5400	512K	2120	2180

• Barracuda Drives - Great for your AV Needs •

1.7 GB	3.5" Barracuda 1	8ms	7200	1024K	1035	1095
2.4 GB	3.5" Barracuda 2	8ms	7200	1024K	1225	1285
2.4 GB	3.5" Barracuda 2W	8ms	7200	1024K	1345	1545
4.2 GB	3.5" Barracuda 4	8ms	7200	1024K	Call	Call
9.0 GB	5.25" ST 410800N	11ms	5400	512K	Call	Call

IBM IBM IBM IBM IBM IBM IBM

IBM drives utilize IBM's advanced Magneto-Resistive (MR) head technology which increases the amount of data stored per disk surface and reduces the number of disks and heads making the IBM series more slim-lined and reliable.

Capacity	Seek	RPM	Int.	Ext.
270 MB	12 ms	4500	$180	$240
364 MB	12 ms	4500	210	270
540 MB	12 ms	4500	260	320
720 MB	12 ms	4500	355	415
1.0 GB	11 ms	5400	595	655
2.0 GB	9 ms	5400	1150	1210

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Capacity	Model	Access	RPM	Warranty	Int.	Ext.
1.2 GB	C3323	9.5 ms	5400	5 Year	$625	$685
2.4 GB	C2490	8.5 ms	6400	5 Year	1150	1210

NEC

Capacity	Model	Access	RPM	Int.	Ext.
540 MB	D3817	12 ms	5400	$275	$335

All drives are tested and formatted with the latest SCSI manager 4.3 compatible software which is 100% PowerMac Compatible.

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SyQuest SyQuest

Capacity	Model	Seek	RPM	Buffer	Int.	Ext.
88 MB	SQ5110C	20ms	3200	32K	305	365
105 MB	SQ3105	14.5ms	3600	64K	245	305
200 MB	SQ5200	18 ms	3200	64K	425	485
270 MB	SQ3270	13.5ms	3200	128K	425	485

Media

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Capacity	Model	Warranty	Price
44 MB	SQ400	5 year	$56
88 MB	SQ800	5 year	66
105 MB	SQ310	5 year	54
200 MB	SQ2000	5 year	78
270 MB	SQ327	5 year	64

CD ROM Drives by NEC

Model	Access	Transfer	Price
MultiSpin 2V	320ms	300Kb/sec	$245
MultiSpin 3Xp	240ms	500Kb/sec	$395
MultiSpin 4Xe	220ms	600Kb/sec	$495

PLEXTOR

4 Plex QuadSpeed	235ms	600Kb/sec	$Call

Optical Drives

HEWLETT PACKARD

Capacity	Model	Access	RPM	Warranty	Int.	Ext.
1.3 GB	C1716T	23.5ms	2400	1 Year	$2315	$2375

FUJITSU DynaMO

Capacity	Model	Access	RPM	Warranty	Int.	Ext.
230 MB	DynaMo	30ms	3600	2 Year	N/A	$965

NEC

Capacity	Model	Transfer	RPM	Warranty	Int.	Ext.
1.3 GB	ODD-1.55	3.5MB/sec.	3000	5 Year	$2020	$2080

Tape Backup Drives

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Capacity	Model	Transfer Rate	Media	Int.	Ext.
2.0 GB	35470	15MB/min.	4mm	$835	$885
3-5 GB	35480	45MB/min.	4mm	1039	1099
4-10 GB	1533A	60MB/min.	4mm	1235	1295
20-50 GB	1553A Auto Tape Loader	60MB/min.	4mm	3195	3295

Exabyte

2-5 GB	8205	263 KB/sec.	8mm	$1485	$1535
5-10 GB	8505	500KB/sec.	8mm	2175	2275
7-14 GB	8505XL	500KB/sec.	8mm	2245	2345
20-50 GB	10i Auto Tape Loader	1 MB/sec.	8mm	CALL	CALL

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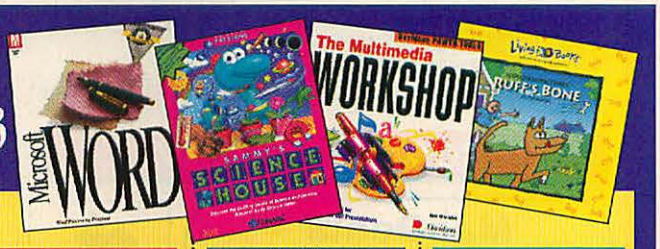

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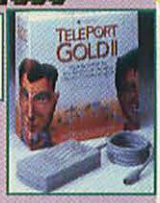

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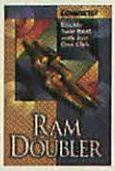

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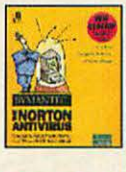

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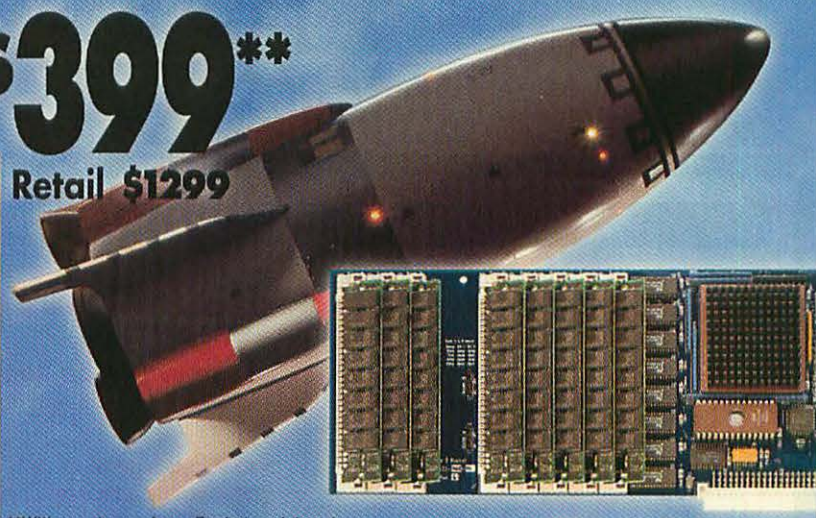

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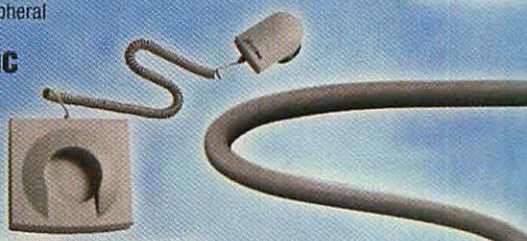

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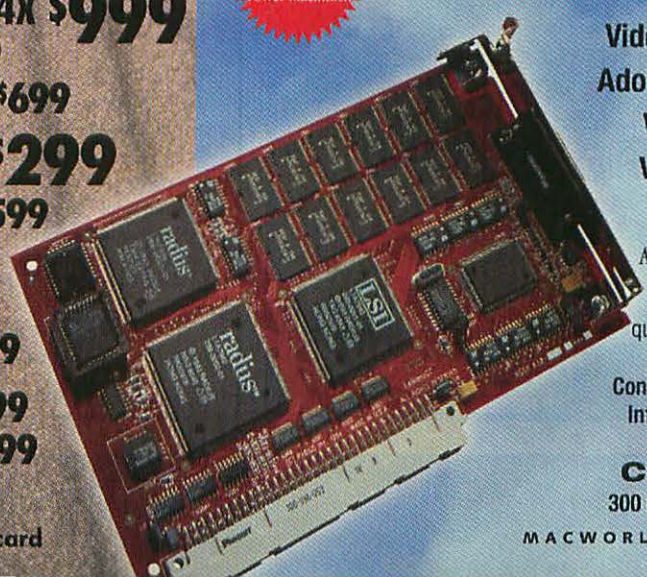

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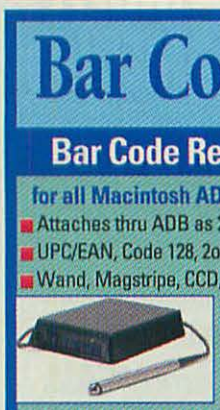

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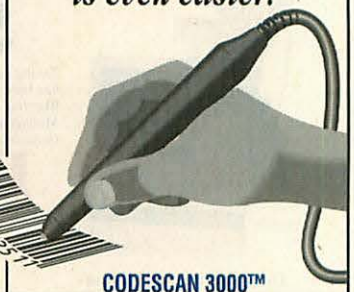

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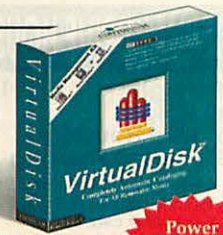

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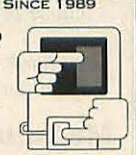

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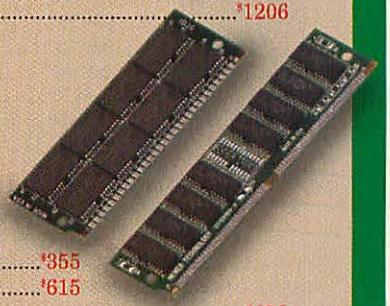

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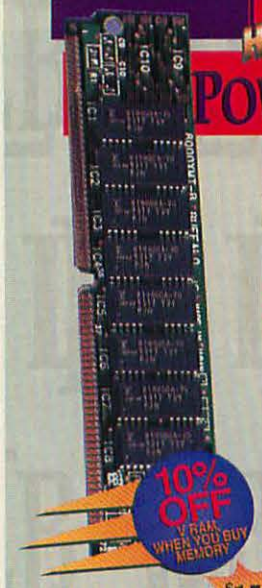

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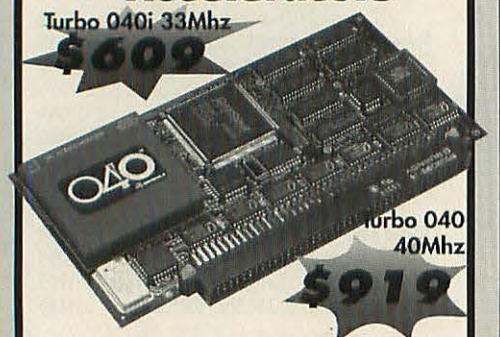

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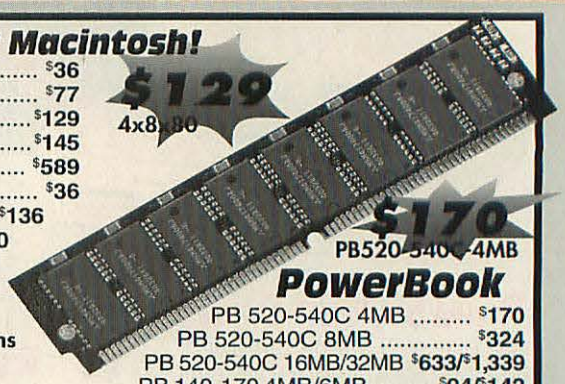

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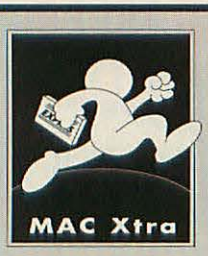

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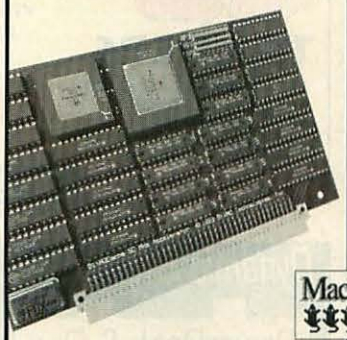

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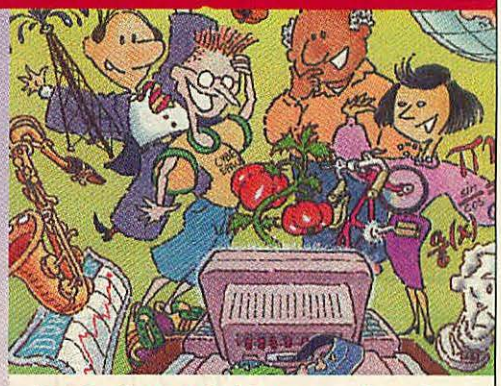

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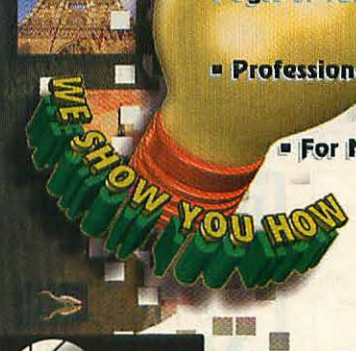

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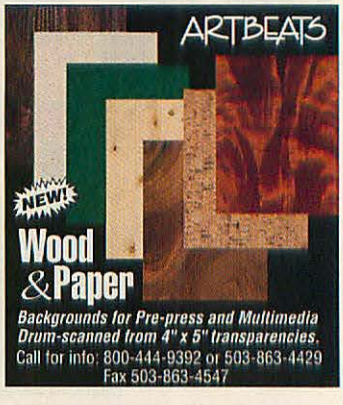

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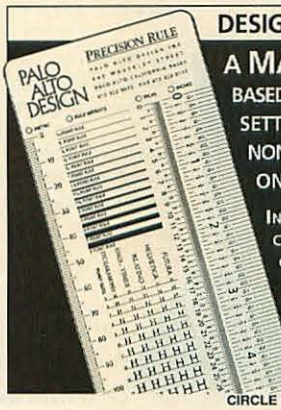

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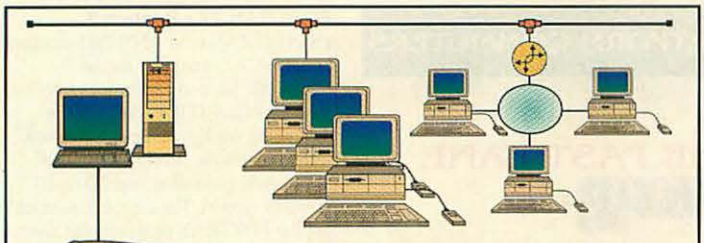

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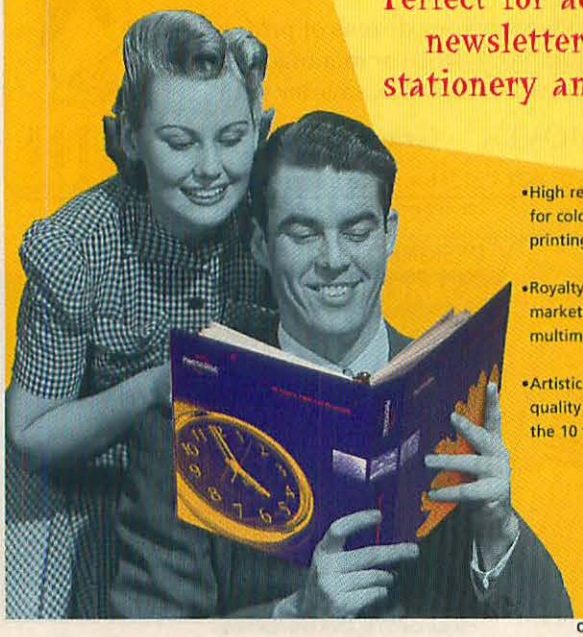

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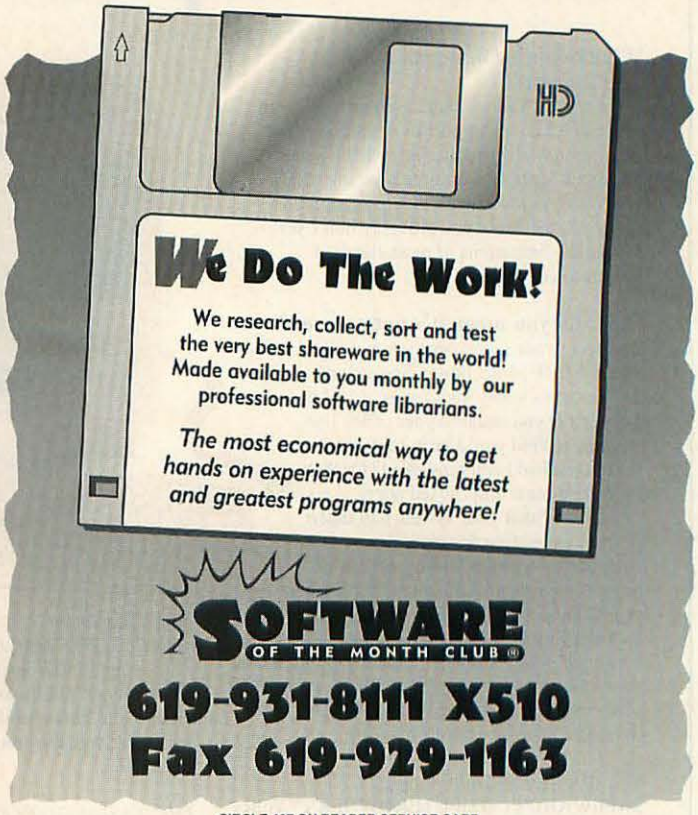

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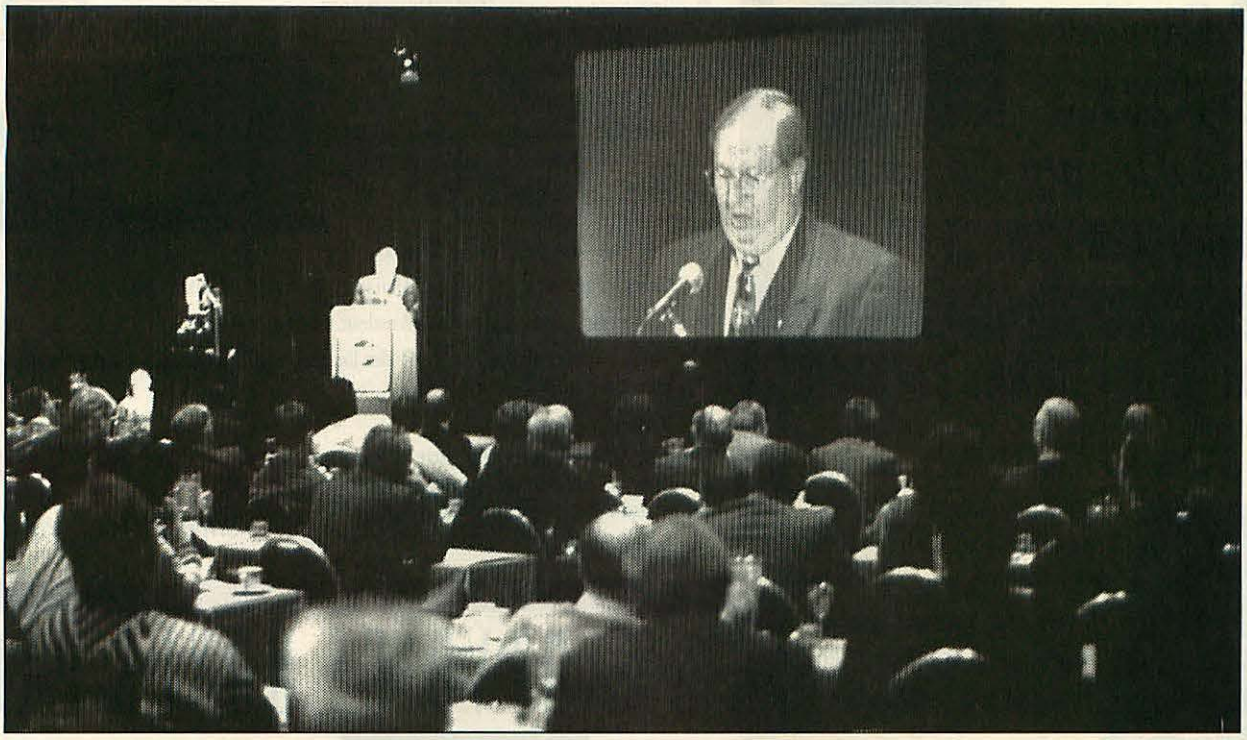

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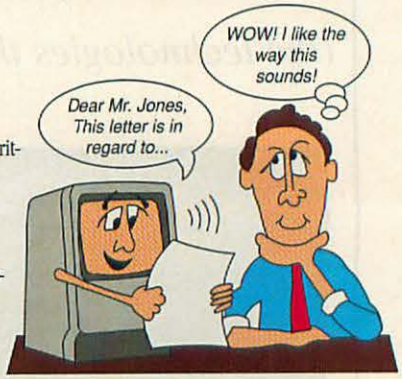

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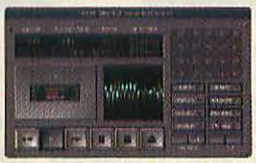

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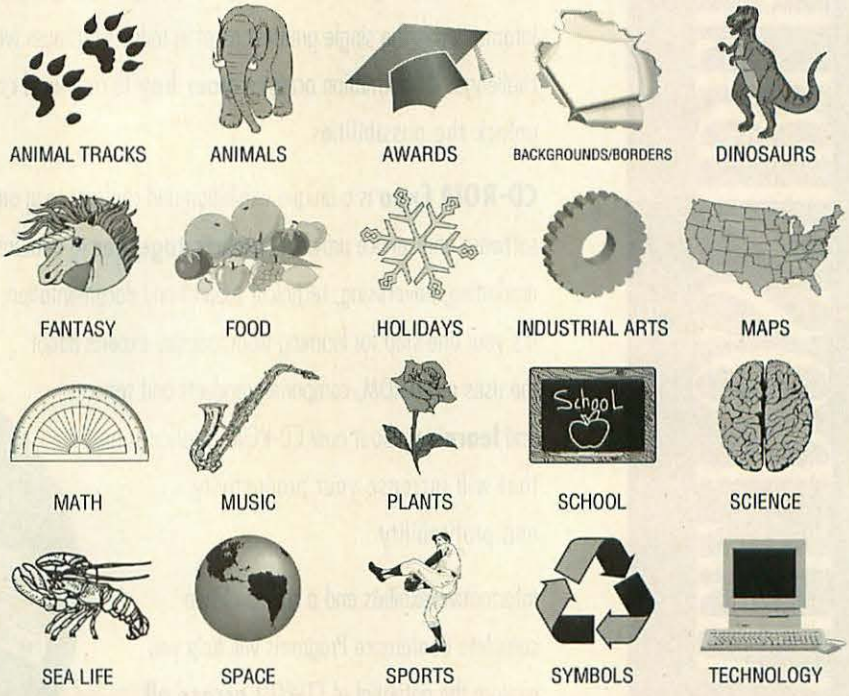

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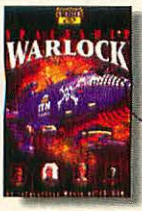

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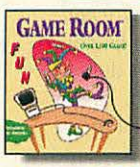

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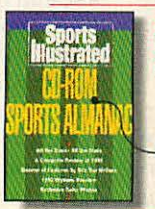

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WISE GUY

BY GUY KAWASAKI

Murder and Acquisition

Who should own Apple Computer?

AS I'M WRITING THIS COLUMN in October 1994, the rumor mill is going wild with stories of companies merging with or acquiring Apple. Much as I love to criticize Apple, I cannot imagine things getting better if another company buys it. A change in the ownership of Apple would amount to murder and acquisition.

Murders and acquisitions are not predicated on logic or good business sense. They are predicated on optimizing the wealth of the acquired company's management.

But given all these rumors, why limit speculation to only a handful of seemingly logical companies? Let's take a look at the whole spectrum of possibilities before we settle on one.

The Big Three

Motorola On the surface, Motorola's acquisition of Apple makes sense—at least for Motorola. Buying Apple would ensure Motorola of at least (and perhaps at most) one customer for its PowerPC chips. Unfortunately, if Apple has to use Motorola chips, pretty soon Motorola will get sloppy because the implicit threat that Apple could switch to an Intel chip would be gone. And a sloppy Motorola is not good for Motorola, Apple, or customers.

IBM The Berlin Wall is down, and *Soviet Union* is an oxymoron, so why shouldn't IBM buy Apple? If I were Bill Gates, I'd pray for this to happen—talk about killing two nerds with one stone. You'd have to look only a few years back at IBM's acquisition and disgorgement of Rolm to see what would happen to Apple. The better plan is for Apple to sell the source code, designs, and spare parts of the Apple IIGS to IBM and tell them it's the Macintosh. By the time IBM figures out that it got taken, the unsold part of Apple could release a new computer that would leapfrog Windows, OS/2, and the Macintosh.

AT&T The problem with AT&T's buying Apple is that AT&T's management is still accustomed to monopoly. Most of the folks at the Baby Bells are just now figuring out how to compete for business. If AT&T really knew what it was doing, it would buy Microsoft (you lose some monopolies, you win some monopolies). Also, on a technical level, how can a hard-core engineer at Apple possibly get psyched about competing with Murphy Brown?

The Unthinkable

Microsoft What a scary thought. The only thing scarier is the idea of Microsoft managing our personal checkbooks. If Microsoft bought Apple, it wouldn't be long before it turned Apple into a failure, at which point Microsoft would sell the company to Novell. Until then, in the fine tradition of Word 6, system software would take 15 minutes to load (even longer if you have more than two fonts), and all the ⌘-*key* equivalents would change. Frankly, Bill Gates is too smart to buy Apple: why should he foot the bill for new ideas when he can copy Apple for free?

Frederick's of Hollywood A stretch, but a definite possibility, because Macintosh owners have exhibited a tendency toward sadomasochism. For example, the people who use QuickDraw GX are obvious crossover customers for whips, chains, and handcuffs. Macintosh software like Sharing Setup, QuickTime, UnderWare, and Disinfectant would take on a whole new meaning. If this happens, expect to see vibrating mice.

Snapple Beverage Company This should happen just so Apple's slogan can be changed from "The power to be your best" to "The power to be some of the best stuff on Earth." We could write in to the Snapple receptionist with our complaints about product shortages and with ideas for new Macintoshes: "Dear Snapple Computer, How about building a PowerLichee Macintosh?" She might answer our letters faster than whoever at Apple doesn't answer them now.

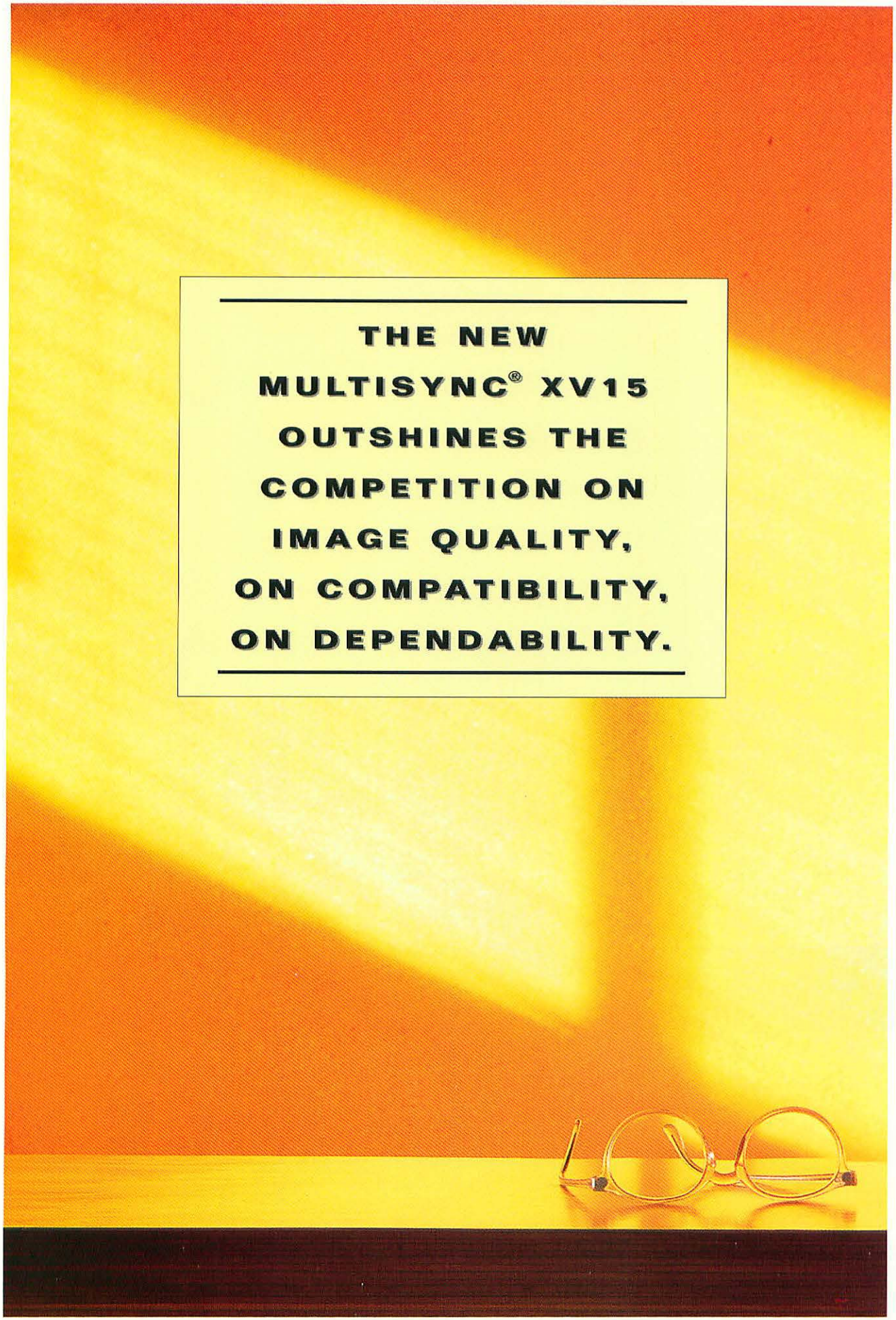
Toys "Я" Us This makes a lot of sense: the Macintosh, after all, is nothing more than a cute graphics toy. Acquiring Apple would enable Toys "Я" Us to sell upgrades to kids who have outgrown their Etch A Sketches. Also, look for the Performa line to be renamed the Mighty Morphin' Macintosh. Apple's plans to make a computer that looks like a machine gun, however, would have to be killed.

The Bottom Line

My vote from among this list of partners is . . . celibacy. In the history of business, have you ever heard of an acquisition that really worked? The bottom line is this: Apple has cash, so it doesn't need to be acquired. In any large market, two or three companies can coexist, and there is no company in the world that would not vomit Apple out in a couple of years with the excuse that "strategic directions have changed." Can we get back to the real issue? None of these companies offers what Apple really needs: a vision for how to leapfrog the Macintosh past Windows before it's too late. **m**

GUY KAWASAKI's views are his own and only sporadically represent those of *Macworld*. He has investments in Bit Jugglers, Global Village Communication, Bookmaker Corporation, and others. He can be reached at macway@aol.com.

JAMES YANG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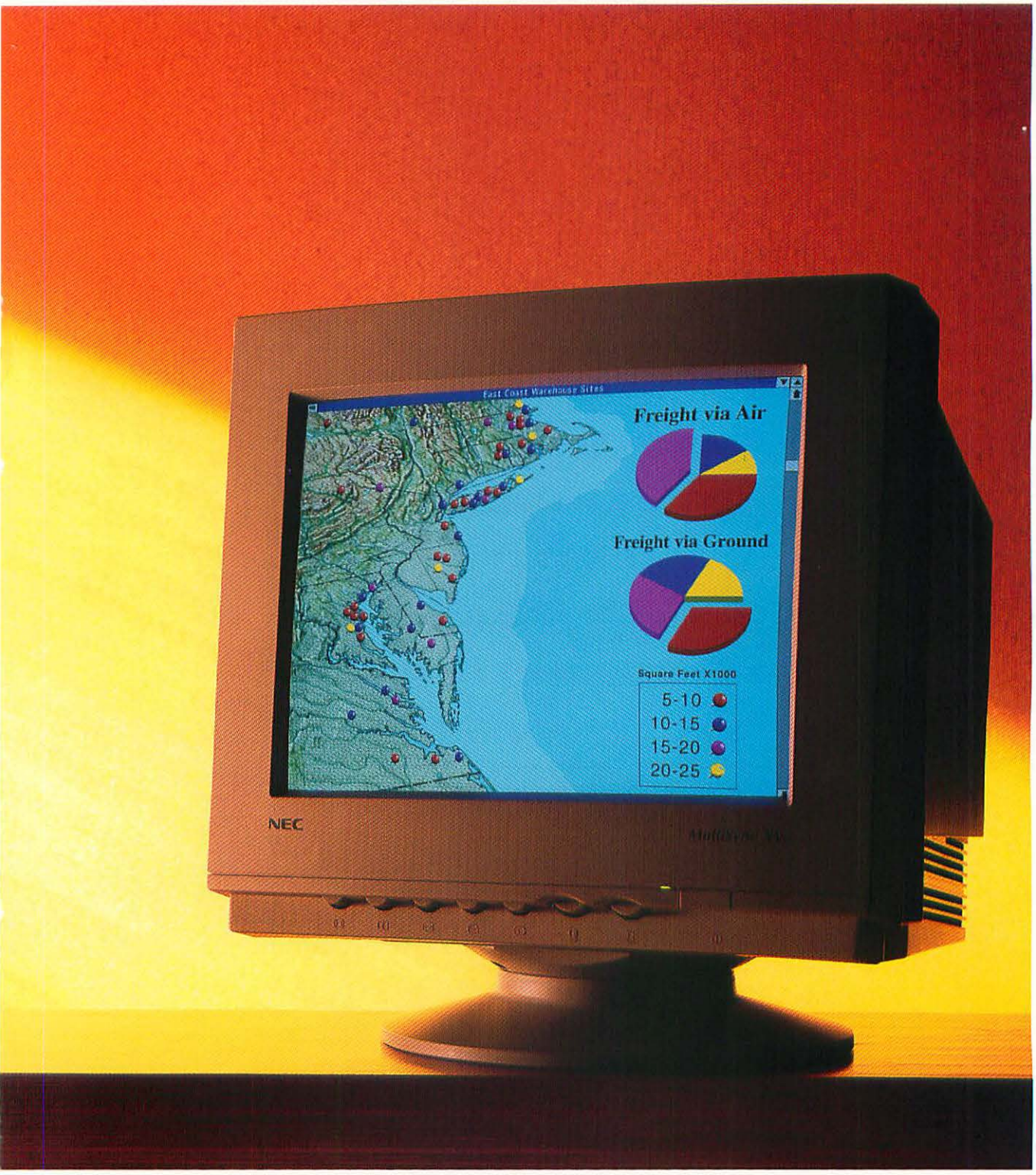

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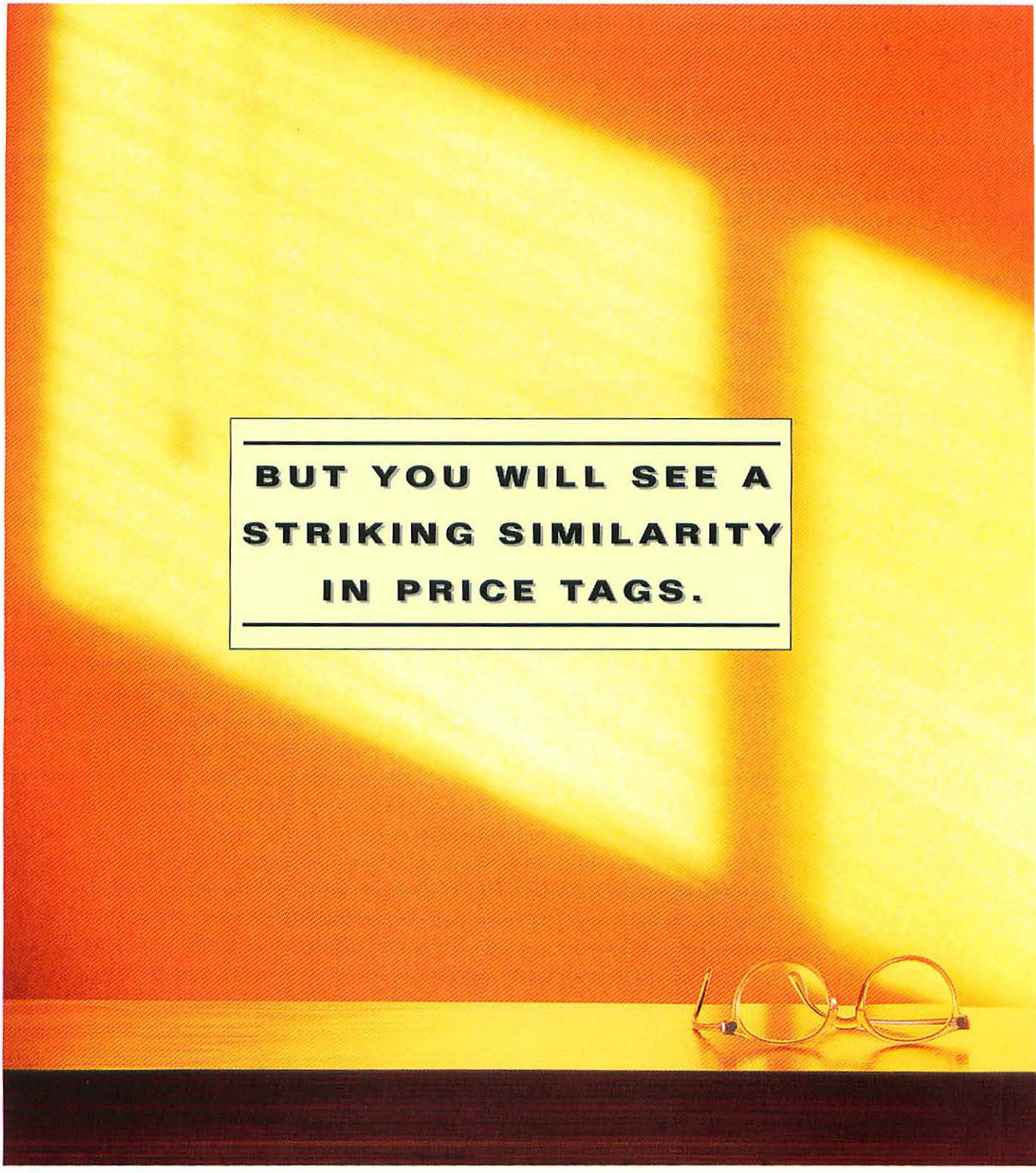

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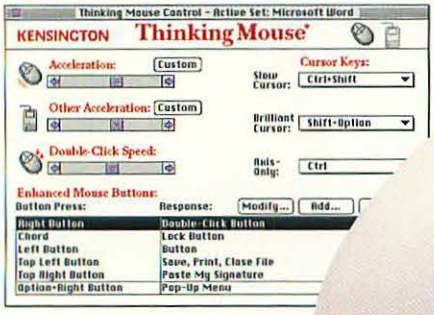

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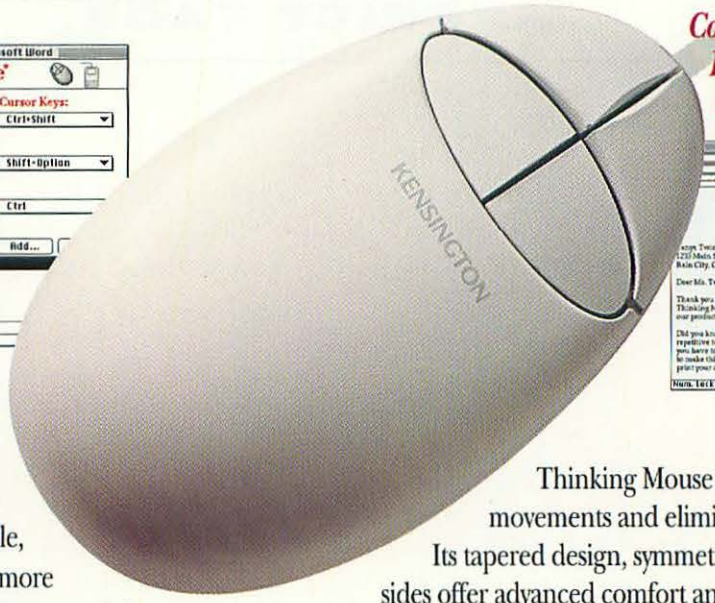

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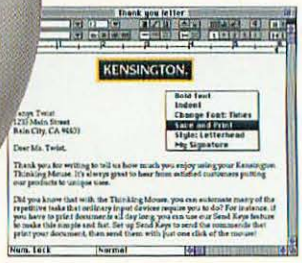

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